The Builder.

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ILLUSTRATIONS.

House near Dublin: View from Garden } .....Mr. W. D. Caröe, F.R.I.B.A., Architect.
Ditto, ditto. View of Entrance Front }

Panelled Room, Clifford's Inn.....Drawn by Mr. John Barbour.

1, 2, 3—Elevations: 4—Details of Carving.

Illustrations in Text.

The Glamour of Crooked Building:—
Ground Plan of St. Mark's, Venice: Reduced from Plan in Mr. Goodyear's Catalogue... Page 312

Sun-dials for a Tropical Latitude:—
Figs. 1 to 3..... Page 316
Figs. 4 and 5..... Page 317

Prize Cottage: Cheap Cottages Exhibition. Plans, etc..... Page 321
House near Dublin. Plans..... Page 322
Sketch in Evesham Church-yard. By Mr. Sydney R. Jones..... Page 323

CONTENTS.

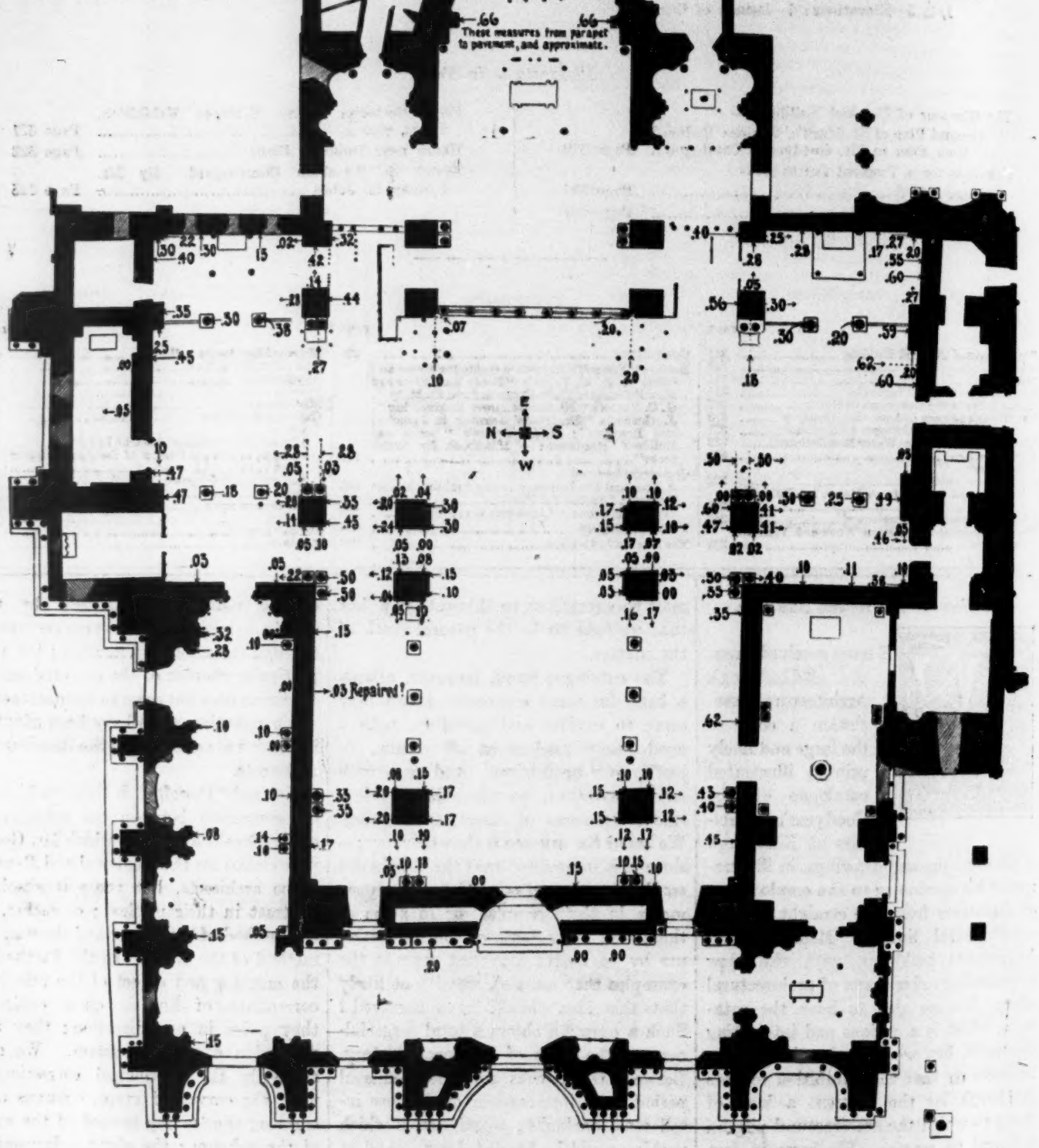
	PAGE
The Glamour of Crooked Building	311
Smoke Abatement	313
Notes	314
Sun-dials for a Tropical Latitude	316
Roman Villas in the Campagna di Roma	317
The Mitchell Library Competition, Glasgow	320
Prize Cottage: Cheap Cottages Exhibition	321
The Joint Committee on Water Regulations	322
Fifty Years Ago	322
Illustrations:—	
House near Dublin	322
Panelling and Details from House in Clifford's Inn	323
Old House, Evesham Church-yard	323
The Architectural Association Week-end Visit to Cambridge	323
Competition	324
Books—"Pannell's Reference Guide for Home and Office"; E. H. Essex's "Roofs and Floors of New Buildings: Their Structure and Stability"; G. C. Marks's "Hydraulic Power Engineering"; J. Horner's "Engineers' Turning in Principle and Practice"; H. R. Towne's "Locks and Builders' Hardware: A Handbook for Architects"	324
Correspondence:—	
A Proposal for Holidays in the Building Trades	325
Concrete Pugging for Floors	325
Rochester Technical Institute Competition	325
Trade Catalogues	325
The Student's Column	326
Metropolitan Asylums Board	326
General Building News	327
Appointment	328
Foreign	328
Miscellaneous	328
Capital and Labour	329
Legal:—	
Alleged Obstruction of Ancient Lights	329
Building in Alleged Breach of London Building Act	329
Ancient Light Dispute	329
Patents	329
Some Recent Sales	330
Meetings	330
Prices Current	331
Tenders	333

The Glamour of Crooked Building.

WE have received from the Edinburgh Architectural Association a copy of the large and finely printed illustrated catalogue of Mr. Goodyear's exhibition at Edinburgh of photographs and drawings, in illustration of his opinion as to the employment of alterations from the straight vertical or horizontal line, in Mediæval and Renaissance buildings, with the view of producing refinements of architectural effect. We are glad to have the catalogue, which is a curious and interesting document, but we fear that it will not persuade us that the exhibition renders Edinburgh for the moment a kind of Mecca to which the architectural pilgrim is bound to repair. We have in fact followed all Mr. Goodyear's illustrated publications on this subject from time to time in American magazines, and therefore know pretty well what his position is; and we can hardly think that the collection at Edinburgh will avail to convert us to a belief in what has always appeared to us to be, in the main, a laborious and fanciful twisting of facts to fit a theory which is itself improbable; and which, if accepted, would only go to prove that the architects of the buildings concerned were elaborate blunderers, who made calculated distortions in their buildings on no principle and which could serve no intelligible purpose. We admit that there are or may be exceptions to this category, but that we take to be the general truth of the matter.

The catalogue itself, however, affords a basis for some comments which may serve to explain and probably, with a good many readers at all events, to justify our scepticism. And first with reference to the unquestionable and scientific refinements of Greek architecture. We heard the argument the other day:—since it is undoubted that the Greeks did employ curves and other delicate adjustments in their temples, or in some of them (the refinements of the Parthenon are by no means universal even in the examples that remain), was it not likely that this idea should have survived? Such a question shows a total forgetfulness of the facts of European history. Between the Greeks and the Mediæval period is an interregnum of absolute intellectual darkness; a gulf across which nothing could be handed down. And in the Renaissance period even space as well as time was a barrier. People travelled little; it took an artist all his time to get from one city in Italy to another, if he did not get knocked on the head *en route;* and there is no evidence, and no probability, that the Italian architects of the Renaissance knew anything of the monuments of genuine Greek architecture on Greek soil. From the middle of the XVth century Greece was an obscure country, the spoil of the Turks; a very unsafe and undesirable place for respectable people to go to. The unearthing of Vitruvius, a little later, might have taught them something as to some of the refinements practised by the Greeks, as transmitted not very accurately through the mind of Vitruvius; but this particular chapter of the expoundings of Vitruvius does not seem to have attracted much attention, or to have been adopted in the columnar Orders of the Renaissance architects.

Not only therefore is there no historical connexion between the refinements of the Greeks and those which Mr. Goodyear claims for the Mediæval and Renaissance architects, but there is absolute contrast in their method; or rather, in the method of the former and the want of method of the latter. In the Parthenon the meaning and object of the principal corrections of line is quite evident; they point in one direction; they are part of a consistent system. We say advisedly the "principal corrections," viz.: the curves of steps, columns and cornice; the leaning inward of the axes of the columns; the slight enlargement of the angle columns, etc. Some minor details, such as the slight differences in the width of the metope openings, which Penrose measured and figured, we have always declined to believe in as intentional or of set purpose, because they display no guiding motive or principle and serve no intelligible purpose; we can only think that Penrose, logical and clear-headed as he was, suffered to some extent from the weakness incident even to able men who give themselves up to the study of a special subject, of a tendency to see that particular thing everywhere. But apart from these minor and doubtful details, the Greek system is



Ground Plan of St. Mark's, Venice: Reduced from Plan in Mr. Goodyear's Catalogue.

consistent and intelligible. But what is there consistent or intelligible in the medley of distortions of all kinds which Mr. Goodyear brings before us and asks us to accept as architectural refinements? There is no principle whatever in them. Looking through Mr. Goodyear's catalogue and his comments, it seems that any deviation from the straight line anywhere, whether inward or outward, is to be taken as evidence of artistic purpose; any bad setting out of a plan, or any freak of irregularity in a plan, possibly due to some local difficulty in the site, is to be regarded as an instance of the adjustment of lines for architectural effect. Whether the lines go in or out does not seem to matter the least. In one place we are told of buttress finials and gables which overhang to the extent of so many inches, obviously to avoid the foreshortening effect of perspective; to which we may reply at once, if in certain places, why not in all? On another page we are shown in a drawing how the upper portion of the pilasters in the nave of St. Mark's falls *back* from the vertical line. If features are set forward to avoid perspective distortion, why are they set backward here? O, we are told, that is to give a greater look of space to the upper portion of the church! Its real effect, of course, would be to diminish the apparent perspective height. A worse feature in architectural treatment could hardly be seen, and if we could believe that the builders did this on purpose, the natural comment would be, then the greater fools they. The tendency of long horizontal or vertical lines in architecture is to look hollow; hence the entasis in the Greek column and the curve upward in the Parthenon steps; hence also the slight convex horizontal curve which Pennethorne said he had discovered in some of the long Egyptian cornices, and which would have been a logical refinement; indeed,

one is surprised not to have found it in the Parthenon, considering the extraordinary care bestowed on the lines of that wonderful building; but we cannot find that Penrose noticed or measured any such correction. Hence also the frequent employment of entasis in Mediæval spires, of which there are many examples in this country; that was an obvious and common-sense correction, the need for which must have been early forced upon the eye of the Mediæval architect by the study of his own buildings after completion. But Mr. Goodyear shows us triumphantly the fact that the façade of St. Mark's, generally taken as flat, has a horizontal curve inward of 10 in. Suppose it has, what the better is it for that? It is simply making a natural optical defect worse. Similarly, we have a view along the cloister of the Celestines, Bologna, with a tape stretched along to show that the line is slightly hollow. The same criticism applies; it is the worse, not the better, for being hollow, and in our opinion it is merely a case of careless setting out. Again, we are given the elevation of a row of wall-arcading in the cathedral of Troja, with the widths between the pilasters carefully given in feet and decimals—7·03, 7·02, 7·44, etc.; and this is called "A Symmetric Scheme in Arcades." It is not a scheme at all; there is no rule or purpose in it; if the spacing was wider at the middle and narrower at the ends, or the reverse, there would be something in it; but the differences are quite irregular, and without any system at all, and we are convinced that they are simply carelessness, or a conviction that it was not worth while to divide them equally. That itself, no doubt, may be called in a sense a principle; it may be argued that a little irregularity is better in a repeating series than strict regularity; but we do not think there is much in that. To our thinking, if a repeating series is used in architecture, it should be one thing or another; either be set out correctly, or the widths should be obviously varied with intention. A series which looks regular but is found, on measuring, not to be quite so, only conveys the impression of clumsy or careless workmanship.

The singular thing is that Mr. Goodyear does not seem to perceive the distinction between a definite and obvious treatment with a view to a perspective effect and the vagaries of plan which he brings before us and to which he seeks to attribute a scientific object. He refers to Fergusson as the first modern authority who noted an intended perspective illusion in a Mediæval church, the cathedral of Poitiers. But what is it that Fergusson refers to? He gives * the plan of the cathedral in question, which is a perfectly symmetrical plan, arranged so as to grow narrower from west to east, and Fergusson notes that the vault also sinks towards that end, so that a false perspective effect is produced; and he (quite rightly) condemns it, and says that the Northern architects were "right in rejecting all these devices." But this is an instance of an open and obvious attempt, which everyone can see for himself at once, at the production of a very commonplace form of illusion.

* "History of Ancient and Mediæval Architecture," Vol. II., page 86.

The symmetrical narrowing of a building to produce an effect of added perspective is a poor and trumpery architectural trick, totally unworthy of anyone but a theatrical scene-setter; but it is a definite and recognisable project, totally different from the vagaries in plan which are included in Mr. Goodyear's illustrations as having some special architectural intention.

As an illustration of this point, and as supplying a further basis in our argument, we give a reduced reproduction of the plan of St. Mark's, Venice, attached to the catalogue, and which is the result of Mr. Goodyear's painstaking and careful measurements. We give it as large as our page admits, on a scale on which the irregularities of the plan can be pretty well realised, though not in so much detail as in the large folding plan in the catalogue. This plan, which we may assume to be accurate, is a valuable contribution to our knowledge of St. Mark's, and the architectural world should feel indebted to Mr. Goodyear for it. But it is, in our judgment, an almost fatal commentary on his general theory. No one who looks at that plan can pretend, we think, to discern any guiding motive for the irregularity of the directions of the walls; nor, as far as we understand him, does Mr. Goodyear venture on any such suggestion in regard to it. It is manifestly a case of careless and indifferent setting out on the ground; and in this respect it exactly corresponds with the description we had the other day of the plans of Byzantine churches from an architect who has spent some months in measuring them. There was not, he said, a right angle or two parallel walls to be found in them; and this plan of St. Mark's answers to the same description. And now for the reason we have drawn attention to this. The figures all over Mr. Goodyear's plan represent in decimals of feet the vertical leanings of walls or piers over those points; all which he maintains to be intentional and for optical purposes. Now just consider the contrast between this assumption and the character of the plan. When we look at the plan of a columnar Greek temple we see a perfectly symmetrical plan laid out and spaced with the most accurate care, and we need not feel surprised that in a building thus carefully laid out there are very careful refinements also in the elevation and the details. But is it credible—is it even common-sense—to suppose that builders who were so careless in setting out a plan as they are shown to have been here, should in erecting it have gone into delicate refinements of setting back and setting forward for the sake of optical effect; that while setting out a plan with an almost wild disregard of rule or regularity, they should at the same time have carefully made an inward curve of 10 in. in the line of the façade? As we have shown, even if they had done so it was a mistake in regard to effect; but in regard to the character of the rest of the plan, is it credible that they even thought of this? St. Mark's is a church tumbling about every way from bad foundations, and we are asked to believe that all this is the result of forethought and contrivance. Everything is pressed into service by Mr. Goodyear's theory; he sees curves everywhere. Illustration No. 174, for instance, showing the front of the north gallery of the nave of St. Mark's from a photograph, is labelled "Curve in Elevation." There is no such thing as a curve to be seen; the balustrade of the gallery was intended to be level—obviously is practically level for five-sixths of its length, and at one end a panel has dropped slightly. There is no evidence of intention, and if there were, there is not the slightest advantage in it; it would in that case be a deliberate blemish with no reason or excuse whatever. In short, our conclusion is that in his theory of the imaginary corrections in St. Mark's Mr. Goodyear has discovered the greatest architectural mare's nest since Street made his extraordinary discovery that the floor was laid in waves on purpose—which every one now laughs at.

We observe that Mr. Goodyear lays much stress, in several instances, on the fact that where pilasters or piers are found leaning outwards the arch between them has not parted, as he says it ought to have done if the movement had been due to settlement. It seems as if one ought to expect that, but we doubt if the argument is as strong a one as Mr. Goodyear thinks. With a very slow and gradual settlement it is quite possible that an arch may accommodate itself to the movement to an extent which would, on first consideration, hardly be expected: And we can name one notable instance of it; that of the portico of Peterborough. Those who saw it before the repairs may remember that, in spite of the moving out of the front arcade, the contemporary vault between it and the main building showed no large or noticeable rupture—nothing in the least comparable to the extent of divergence of the arcade from the perpendicular. But we forget that Mr. Goodyear has not yet turned his attention to English architectural monuments. Whenever he does, we have no doubt he will discover that the west front of Peterborough was deliberately built leaning outwards, for considerations of architectural effect.

SMOKE ABATEMENT.

THE Medical Officer of Health for the City of London (Dr. Collingridge) in his last annual report said that, "a misleading suggestion having been offered in the public Press that smoke may have some disinfectant properties and is therefore harmless, I cannot too strongly emphasise the danger to public health from the loss of light, vitiation of the atmosphere, and the dirt, suffocation, and depression due to the pall of smoke suspended over London, especially in the colder season of the year, arising not only from factory chimneys but from every domestic fire. A widespread recognition of this evil is the first step towards its abatement."

We heartily agree with Dr. Collingridge in his emphatic and unqualified condemnation of smoke, but we believe that recognition of its evil effects has for a long time been widespread, and that the question upon which there is divergence of opinion is not whether smoke is a nuisance, but with what degree of stringency laws against smoke can be

enforced without unduly hampering the various industries in which coal is necessarily used as fuel. So far as domestic fires are concerned, every householder would be delighted if his neighbours were forbidden to allow smoke to issue from their chimneys, but would keenly resent any interference with his own liberty of action in regard to smoke emission. The righteous indignation of householders fined for allowing dirty chimneys to catch fire is sufficient evidence of this.

For several centuries the people of London have been protesting against the emission of smoke from their neighbours' chimneys, and spasmodic efforts have from time to time been made to restrict it. During the XIXth century much progress was effected in the direction of burning coal without the simultaneous production of smoke, and in enacting laws to enable the local authorities to put a stop to the persistent emission of black smoke from the factory chimneys in their respective districts. Unfortunately, however, many local authorities have up to the present time neglected to take any steps towards enforcing such laws as have been enacted, and in consequence the atmosphere of many districts continues to be befouled to an unnecessary extent.

Probably the most energetic body ever formed with the object of preventing, so far as is possible, the pollution of the atmosphere with coal smoke is that known as the "Coal Smoke Abatement Society." Although founded so recently as the year 1898, it has already succeeded in obtaining an abatement of smoke nuisance in many hundreds of cases, and has acted as an indefatigable remembrancer to supine local authorities.

Those whose memories enable them to compare the London winters of the early eighties of the last century with those of the last six or seven years cannot doubt that, generally speaking, the fogs are already less dense and less dirty than formerly.

A welcome indication of the increasing attention which is being given to the smoke problem is afforded by the publication of a book devoted solely to this subject by Mr. William Nicholson, Chief Smoke Inspector to the Sheffield Corporation.* We cordially commend this book not only to those to whom it is specially addressed, but to all who are interested in the movement to prevent unnecessary pollution of the atmosphere with smoke. Like many other officials of controlling authorities, Mr. Nicholson is rather inclined to urge the enactment of laws which would place all who use coal completely at the mercy of the local authorities. If corporations and borough councils were composed only of responsible business men we should have little objection to this, but in certain districts so many hysterical faddists and irresponsible ignoramuses now find seats on the local council that unjust persecution might result if these councillors were allowed to ride their hobbies uncurbed. We hasten to say that we have no particle of sympathy with either manufacturers or private householders who permit any unnecessary smoke to be emitted from chimneys under their control, and we are always pleased when remissness in this matter is followed by a heavy penalty. But it is only fair to add that history shows that local authorities when they own steamboats or electricity generating stations are apt to pollute the atmosphere with black smoke quite as badly as are private coal consumers.*

So long as raw coal continued to be practically the only available fuel the smoke problem remained one of the most difficult and perplexing with which local authorities were called upon to deal, but during recent years a new factor which is likely to prove more conducive to smoke abatement than any Act of Parliament has appeared. In thousands of instances it has been found that gaseous fuel is more economical than coal, and a general displacement of steam boilers and engines by gas engines has been taking place.

Mr. Nicholson urges that the chimney of a private dwelling-house should no longer be exempt from the law prohibiting the emission of unnecessary smoke, and wishes to compel the owners of houses to put in smoke-preventing grates and stoves and to make the occupiers responsible if these are so carelessly used that they emit unnecessary smoke. In enforcing laws of this nature much would depend upon the spirit in which the controlling authorities and their officers carried out their duties. If they regarded themselves as policemen whose efficiency could be gauged only by the number of convictions they obtained, then the position of owners and tenants would be likely to become intolerable; but if they were content to assist householders by freely giving helpful advice as to the best methods of consuming coal, and to prosecute only those who were wilfully negligent, then much good might result from the making of such laws as those recommended by Mr. Nicholson.

Fortunately in the case of private dwellings, aswell as in the case of factories, gaseous fuel is doing much to abate the smoke nuisance. The Chairman of the Great Eastern Railway Company (Lord Claude Hamilton) told the shareholders at the last general meeting that of the 22,000 houses in Norwich 16,000 are fitted with gas stoves. He estimated that each house would consume an average of three tons of coal per annum if gas stoves were not used, and that the householders of Norwich therefore consume 48,000 tons of coal per annum less than they would in the absence of gaseous fuel. These figures were advanced to partially account for the great decrease in the quantity of coal carried into Norwich by rail. The coal required for gas manufacture is, we understand, mostly conveyed to Norwich by water.

We do not know whether Lord Hamilton's estimate is even approximately accurate, but it is quite certain that gaseous fuel has already displaced a vast quantity of raw coal not only in the private houses of Norwich, but in those of all the large towns of England. Since this is a material step towards ridding the kingdom of smoke, it is matter for national congratulation; and everything points to a very rapid extension of the use of gas both as gas and in the form of gas-generated electricity. Coal gas at 3s. or 2s. 6d. per thousand cubic feet is, of course, an impossible fuel in many cases, but there is already a general movement throughout the country towards the supply of a cheaper lower-grade gas suitable alike for fuel and for incandescent lighting.

With regard to the use of the smokeless solid fuels, anthracite and coke, it can only be said that, although these fuels have much to recommend them, they do not find much favour with the general public as domestic fuels. Repeated attempts have been made to bring them into general use in London, but their sale for household purposes is still comparatively limited, although they are very largely used by manufacturers. Ten years ago coke had a very extensive sale among the poorer classes of London, but that business has been considerably reduced by the general introduction into workmen's dwellings and tenements of the penny-in-the-slot gas meter, and the same thing has doubtless occurred in many other towns. Coke was formerly unpopular with the servants of the wealthier classes because it was sold in large masses which were troublesome to break, but now that it can readily be obtained broken to a size suitable for use it might with advantage be added in suitable proportion, as a smoke-reducer, to the much cherished flame-and-smoke-producing coal.

The war against smoke is especially worthy of the support of readers of this journal, for not only does soot exert a destructive influence upon the surface of all limestones and dolomites by converting the carbonates into soluble sulphates, but it tends to give a depressing funereal appearance to all descriptions of buildings, and speedily obliterates all the finer details of sculpture exposed to it. Removal of all trace of smoke from the atmosphere of London would lead to a marked change in the appearance of its buildings. Encouragement would be given to the employment of external decorative stonework; trees, shrubs, and flowers would flourish in a manner at present impossible, and would retain their natural beauty of colour for a longer time; and the resulting extension of the daily periods of sunshine would probably be followed by a marked decrease in the prevalence of tuberculosis and such other diseases as are propagated by germs which succumb when exposed to sunlight.

* "Smoke Abatement: a Manual for the Use of Manufacturers, Inspectors, Medical Officers of Health, Engineers, and Others." By William Nicholson, Chief Smoke Inspector to the Sheffield Corporation. With fifty-nine illustrations. London: Charles Griffin & Co., Ltd. 1905.

NOTES.

The Bois de Boulogne Threatened.

THE Paris public heard recently, with a feeling of dismay which will be shared by all visitors to Paris, of a proposal to appropriate part of the Bois de Boulogne, between the Porte d'Auteuil and the Porte Maillot, for a building scheme, to be carried out as soon as the old fortifications are demolished, and which is to comprise the erection of business house (*maisons de rapport*) on a site at present occupied by lawns and shrubberies. The question is the more serious since this is believed to be only a prelude to a scheme for surrounding the whole

of Paris with a circle of large buildings of similar type to those now proposed, as soon as the whole extent of the fortifications has been dismantled. On the initiation of the *Figaro*, a "Comité de Defense du Bois de Boulogne" has been formed, with M. Frantz Jourdain, the architect, as chairman, and is preparing a petition to the authorities on the subject, demanding that the scheme should be abandoned without bringing it up even for discussion in Parliament. It is hoped that this protest will have its effect, especially as the Municipal Council will bring forward, in their next Session, a counter proposal which will necessitate a considerable pecuniary sacrifice to the Municipality, but will be for the public benefit. This proposal is to create, with the financial assistance of the Municipality, an avenue 200 mètres wide all round Paris, on the site of what used to be known as the "zone militaire," with spacious squares at intervals. Whether or not this fine scheme is carried out, the public feeling aroused by the proposal to take any part of the Bois for building land has been so strongly and decisively manifested as to convince the Government that, whether from the æsthetic or the hygienic point of view, the scheme is publicly regarded as a piece of vandalism, not to be countenanced on any commercial pretext.

The Standardisation of Water Regulations.

By the adoption of the Report made by Sub-Committee A of the Joint Committee formed for the purpose of framing regulations more satisfactory to water consumers and more efficient from the standpoint of water authorities than those now in effect it is clear that good progress is being made in this useful work. With regard to the standardisation of fittings we may mention that the Committee have made no attempt to deal with pipes, tubes, and threads which have already been taken in hand by the Engineering Standards Committee. Other fittings, however, have been suitably considered, and there is reason for thinking that the results will be generally appreciated by water engineers and plumbers. Whether, however, the talked-of standardisation of fittings, if carried out, would be entirely a benefit to the public, may be a question. It means sometimes the refusal to accept a perfectly sound fitting because it does not come into a catalogue drawn up on *doctrinaire* principles. We could mention one case in which an officer of the New River Co. demanded the removal and replacement of a tap which had been in use for seven years without any repair, and was as tight as the day it was put in, because it was on Lord Kelvin's principle, and the Company "did not like the Kelvin tap." No reason for the "dislike" was given; the owner refused to obey the absurd order, and the official thought better not to press it.

The Peace Palace at Hague.

JUDGING from a pamphlet of extracts which has been sent to us, called "Judgments of the Dutch Experts on the location of the Peace Palace" (translated into very eccentric English), it seems that locally the proposed site at Zorgvliet is regarded as most unsatisfactory. It is said that the site, to begin with, is too small, and that it is situated close to land which is liable to be let to speculating builders, and will probably be covered with small houses. If this is true, it is certainly not very promising for the architectural success of the enterprise. A Peace Palace, to be worthy of such a lofty title, ought to be not only a great building, but a building with spacious and stately surroundings; if it has not these it will be a failure.

Polluted Water Supplies.

WE may have to wait a long time before a central authority is created for the control and protection of sources of water supply. In the meantime, however, the technical officials of the Local Government Board ought to be able to prevent the establishment of sewage conduits and farms in places where they involve danger to the public health. The case of Crickhowell proves that the Board cannot invariably be relied upon in this respect, for it is reported that all the wells in the Clydach Valley are so polluted by sewage percolating through the limestone from the Brynmawr carrier that the inhabitants are rarely free from typhoid. In this instance lack of geological knowledge more than anything else seems to have been the cause of the trouble.

Scientific Research in the United States.

WE referred last week to the important investigation commenced by the United States Government into the properties of building materials. Of course, this represents a very small proportion of the public research work undertaken in America. Lord Mountmorres, who has just returned from that country, is much impressed with the scope of the various departments occupied in different branches of applied science. The bureau of standards is one of the most important establishments, corresponding generally with our National Physical Laboratory, but founded and equipped on a far larger scale. The Department of Agriculture comprises sections dealing with biological chemistry, bacteriology, and other subjects of practical value. Other departments devote attention to botany, soil investigation, forestry, and chemistry, the last having no fewer than twelve separate sections. Altogether there are forty-one scientific departments in connexion with the Government, in addition to the semi-official Smithsonian Institute. It is a great pity that our own Government is too poor to support institutions of similar character.

Steel Railway Carriages.

A WELCOME sign of coming improvement in railway rolling-stock is given by the decision of the District Railway and the Great Northern and City Railway to make use of steel-bodied carriages on their lines. Vehicles of the kind have been adopted by other companies in the past, but not to any considerable extent. The most striking advantage of the innovation is the additional safety offered to passengers in time of accident. Injuries by splintered woodwork and by the distressing fires which almost always break out after serious accidents will be entirely obviated. At the same time the companies will derive benefit from the reduction of weight and consequent saving of power.

Motors and the Roads.

WE fear the Royal Commission about to inquire into the working of the Motor Car Acts may not have powers to inquire into the treatment of the roads, yet this subject urgently calls for investigation In Kent experiments are being made on various sections of the high roads, but some of the material used is far too hard for horses' feet, whilst in other places a soft kind of asphalt is used which not only greatly increases the draught of carriages, but which in the winter, when rain is followed by frost, will simply be converted into skating rinks. The experiments seem conducted with a view to diminishing dust alone without due regard to other considerations, and especially the varying conditions of climate.

Ayr "Auld Brig."

SEVERAL reports have been received by the Ayr Town Council in response to the invitation mentioned in our recent "Note." Among the reports is one from Mr. Francis Fox, who, while appearing to favour the entire reconstruction of the bridge, expresses the opinion that it could be saved at a moderate cost by grouting the superstructure under pressure, afterwards paying attention to the foundations. The present condition of the bridge is chiefly due to the perishing of the mortar, which has occurred to such an extent that many of the arch stones are merely held in place by friction, some of the stones are damaged, and the interior masonry of the piers is loose in such parts as have been examined. We have no doubt whatever that by the injection of cement grout and by the execution of some minor but important repairs recommended the superstructure could be rendered perfectly safe and in all probability stronger than it was when first built. At the same time it must be borne in mind that the foundations are in a somewhat perilous condition owing to scour of the river bed. Consequently it is necessary that steps should be taken at the earliest possible moment to stop the undermining action and to prevent its recurrence in the future. This presents no difficulty, and the tentative proposals made by Mr. Fox are judicious as well as perfectly feasible.

Highland Cottages.

THE Scotch in their practical way have certainly found a means by which to cheapen part at any rate of the cost of cottages, though it is singularly unattractive; for every month galvanised iron sheeting is coming more and more into use, and it would seem as though it would in the Highlands soon supersede every other roofing material. It is met with alike in remote glens, in secluded bays, in thriving villages. The low, single-storied, white-walled cottage, with its heavy-looking roof of reeds, has given place to one with the trim and ugly galvanised sheeting. In villages, porches and outhouses of all kinds are covered with this kind of roofing. Where "the laird" is the proprietor the roof is often painted a dark red, and the roofs of new kirks will

sometimes be noted of this same material and colour. Like the motor, which is found all over the Highlands, in the most unexpected places, the new roofing has come to stay, as has the barbed wire fence, which has taken the place of the agreeable timber boundary. In fact, the Highlands are covered with miles of wire fencing.

Marble Hill, Twickenham.

SOME repairs, decorations, and other minor works are about to be carried out at the house which, together with the Peel estate of about 67 acres, was acquired two years ago as a river-side park by the London County Council. Marble Hill was originally built for Henrietta Howard, Countess of Suffolk, the "Chloe" of Pope, and Mistress of the Robes to Queen Caroline of Anspach, after designs by, reputedly, the Earl of Burlington and the Earl of Pembroke and Montgomery, King George II. contributing from 10,000*l.* to 12,000*l.* towards the cost. Cobbett's "Memorials of Twickenham" records that Pope laid out the gardens and that Swift stocked the cellar. The house passed to the Countess's brother, Sir John Hobart, afterwards Earl of Buckinghamshire, and subsequently to another royal favourite, Mrs. Fitzherbert, Richard Marquis of Wellesley, General Peel, the famous sportsman, and his widow, Lady Alicia Peel. The house forms an interesting example of the earlier XVIIIth century period; the first-floor rooms are much more lofty than those on the ground and second floors, and Honduras mahogany was largely used in the interior, the floors of some of the rooms and the staircase being made of that wood. The property was offered for sale, but withdrawn after a bid of 52,000*l.*, in June, 1888, when there was some danger that it would share the common fate and suffer the presage of Dean Swift's "Dialogue between Richmond Lodge and Marble Hill." The building operations begun in July, 1901, were, however, averted, and the view from Richmond Hill preserved, at an outlay of 72,000*l.*, towards which several public bodies subscribed.

The Cheap Cottages Conference.

AT the Conference held at Letchworth on Saturday last to consider the subject of cheap cottages, we observe that Alderman Thompson (Chairman of the National Housing Reform Association) admitted that the 150*l.* price attached to many of these cottages was a delusion. Many of the visitors, he said, had put the pertinent question to exhibitors—"Would you repeat this cottage for me at such and such a place for the stated cost?"; and that the answer was "No; the figures had been used as illustrations (!) rather than as hard and fast statements of what such a house will cost." This admission exactly confirms what we said at the outset in our first review of the exhibition. The speaker added, however, that they knew that half the houses on the ground had been *bonâ fide* built there for the stated cost. Building materials, it was stated, are exceedingly cheap in the Letchworth district; that may account for some of the low prices stated; in some other cases, we believe, the builders used materials in stock manufactured by themselves, which might well afford an opportunity for using up a surplus of stock for which there was no other demand. But it is obvious that the exhibition has not really produced the desirable cottage residence at 150*l.* which was asked for; nor did we expect that it would. Alderman Thompson, however, we are glad to see, is not one of those featherheaded people who are for making an onslaught on all rural building by-laws as an unnecessary incubus, for the resolution which he moved included the following very moderately-worded recommendation:

"The need for the thorough improvement and development of the building by-laws for each district, in order to render absolutely secure the vital improvements of the past in regard to sanitation and health, whilst giving full opportunity for an encouragement to the adoption of new methods of building, new materials, etc.—wherever these can be shown to be of real value and service to the community."

No one can complain of that.

SUN-DIALS FOR A TROPICAL LATITUDE.

A CORRESPONDENT in East Africa writes:—"Would you or any of your readers kindly tell me how to lay out a sun-dial under the following conditions?

This place is about twelve miles south of the equator, and as the sun passes overhead twice a year it is obvious that the ordinary arrangement of style or gnomon will not apply.

I have looked up the subject in two text-books, but the systems given in them appear to refer to places outside the tropics of Cancer and Capricorn: within these latitudes entirely different conditions seem to prevail."

As far as his letter shows, the writer does not seem to realise that the gnomon, in whatever latitude, represents the earth's axis, and is parallel to it. If a dial were set up at the north pole, the gnomon would be vertical; if set up at the equator, the gnomon will be horizontal. The difference is not in

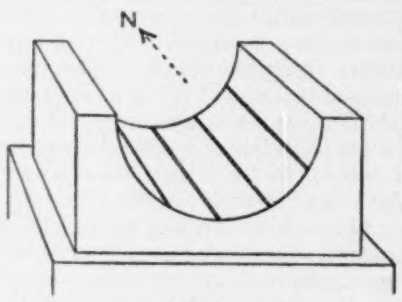


Fig. 1.

principle, but in arranging the plane on which to get the shadow of the gnomon. The setting out of dials in books written in the north naturally proceeds on the assumption that the sun is always to the south of the dial, more or less. The altered condition in the tropics is not only that the sun is much more vertical, but that it will be sometimes north and sometimes south of the dial, therefore a sun-dial on a vertical wall is out of the question, as there will not be continuous sunlight on it. But a dial with a horizontal table presents no difficulty, always remembering that the gnomon also must be horizontal.

I would suggest that a very simple equatorial dial may be made without any gnomon at all. Take a block of marble or white stone, and cut a true semicircle out of it, as shown in perspective in Fig. 1. Place it on a column or stand with the axis of the semicircle due north and south, and rule six lines on it, running north and south, at equal distances of 30 deg. of the semicircle. From sunrise to midday the eastern edge of the semicircle would act as the gnomon. At noon there would be no shadow, and from noon to sunset the western edge of the semicircle would become the gnomon, the shadow showing the hours before noon in one direction, and those after noon in the opposite direction. This is illustrated in Fig. 2, showing

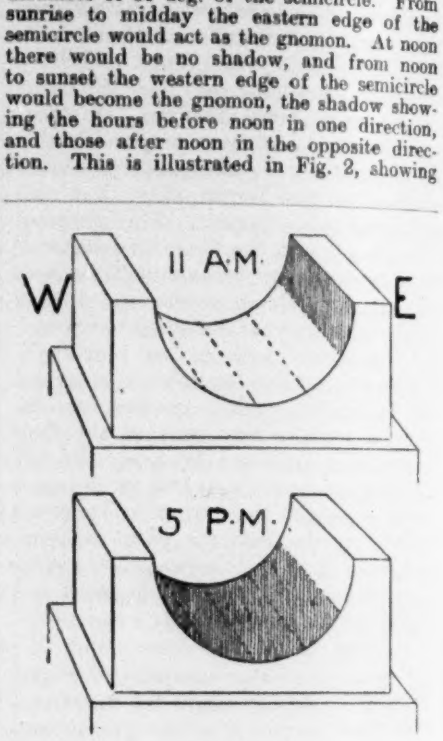


Fig. 2.

the shadow as it would be at 11 a.m. and at 5 p.m. respectively. The elevation of the sun, of course, corresponds to 15 deg. for each hour; but as the gnomon is at the circumference and not at the centre of the semicircle, the travel of the shadow is doubled, and each hour represents 30 deg. on the surface of the semicircular dial table.

The only drawback to this is that as the sun gets nearly vertical the shadow, on the portion of the semicircle which becomes nearly vertical, would rather want sharpness of definition, and the precise moment of noon would be difficult to fix. This latter point could be got over by having a wire stretched north and south along the central axis of the semicircle.

A modified form of this dial, with a horizontal metal gnomon, could be made by having the recording surface more extended laterally and taking the form of a lesser segment of a circle, with a gnomon pointing north and south across the centre and at a level with the rising ends of the segment, as shown in section on Fig. 3. By drawing the dotted semicircle with the section of the gnomon as the centre, dividing this semicircle up into spaces of 15 deg., and producing lines from the centre through these points till they cut the surface of the curved recording table, the hour lines on the latter will be given,

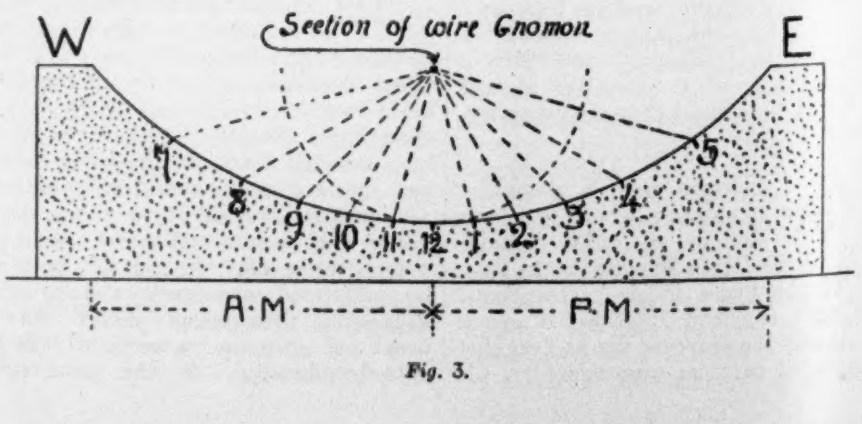


Fig. 3.

and the gnomon will register the twelve hours straight through from west to east of the recording table.

The reason for having the recording table in the form of a segment is of course merely a practical one—to catch the shadow within a reasonable distance. Theoretically, an extended flat plane would do just as well, but when the sun was low the extension required would be so great as to be impracticable. Theoretically also, this method of the metal gnomon in the centre could be carried out with the semicircular table and the wire; the objection practically would be that at a low elevation of the sun the shadows of the gnomon and of the edge of the semicircle would come very close and would rather clash with each other. By adopting the flatter curve for the recording table, the shadow of the edge of the table is not thrown on its surface for a great part of the day, and when it is (during the first and last two hours of the day), is kept clearer of the shadow of the gnomon, and is disregarded, and only the shadow of the gnomon is attended to. Figs. 4 and 5 show sketches of

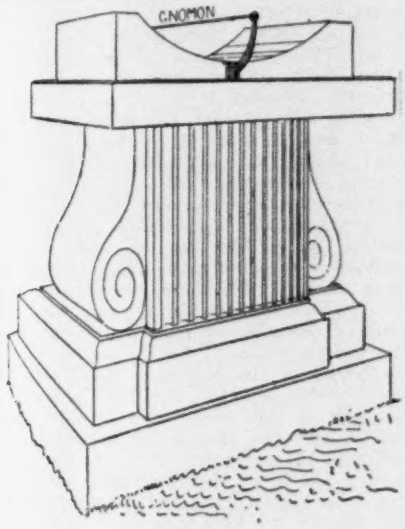


Fig. 4.

Fig. 5.

two forms in which this dial might be carried out. With the sun so nearly vertical, the shadow of the brackets carrying the gnomon would not be projected on the recording table.

If the dial is set out north and south by compass, the direction must of course be corrected for the difference between true north and magnetic north.

At the position given by our correspondent, twelve miles south of the equator, the gnomon or the north and south axis of the dial may be regarded as practically level; twelve statute miles at the equator amounting to 10′ 21″ of arc, the versed-sine of which, on the proposed scale of 12 in. from north to south of the dial-plate, may be considered as a negligible quantity. The dip of the earth's surface at twelve miles is, in round numbers, 99 ft.; or (to put it in a way more directly illustrative of the present question), if a line be drawn southward from the equator parallel with the earth's axis, at twelve miles it would be 99 ft. above the surface, or $\frac{1}{8\,\frac{1}{10}}$ of the surface measurement. Accordingly our dial, to be parallel to the polar axis, would have to be raised in that proportion on the south side; but with a width of 12 in. this would only amount in this case to ·0187 of an inch, hardly more than the thickness of a piece of writing paper, and its adjustment to that extent would have no visible influence on the result. When we get further south it is different. At 2 deg. (139 statute miles) south of the equator, the vertical measurement or versed sine would be (in round numbers again) 12,880 ft., or $\frac{1}{7}$ of the surface measurement; and the south side of the dial would in that case have to be raised $\frac{1}{7}$ of a foot, or ·21 in., from the horizontal, to render it parallel with the polar axis; and so on; the south side of the dial being proportionately raised as we get further from the equator. In extra-tropical dials the recording-table, it is true, is generally kept horizontal (or, in the case of wall dials, vertical) for all latitudes, and the position of the hour-shadows projected on it, for the sake of appearance; but in the tropics, where the dip of line need not be so great, it would seem a pity to disturb the simplicity of the reading on an arc of a circle parallel to the gnomon, for the sake of getting the dial-table horizontal. In fact, the slight slope in the recording-table (for 2 or more degrees south) would be a kind of explanation of its object and a visible exposition of the latitude of the place.

Of course this form of dial has not the poetic associations which cluster round the familiar appearance of the old-fashioned English garden dial, with its column and table and triangular gnomon; but it is a form which seems naturally to arise out of the circumstances and situation, and if largely used within the tropics, might in time gather its own associations.

H. H. STATHAM.

ROMAN VILLAS IN THE CAMPAGNA DI ROMA.

IT has been truly said by a recent writer* that a history of the Roman villa has yet to be written. There are a certain number of monographs on isolated villas of the Imperial Period; but, as to the origin of the Roman villa and its development in the days of the Republic, our knowledge is small. And yet, as the writer points out, the life in these villas presents to us an interesting side of the Roman character. Here it was that statesmen and purely literary men alike spent a learned leisure far from the distractions and disturbances of the large cities, and from the remains of the correspondence of such men we gain a number of interesting details, which may help us to draw a clearer picture of the whole.

It is not altogether correct to say that the Romans invented the villa,† for we hear of the Athenians, at the time of the Peloponnesian war, losing their country seats, with their fine buildings and costly furniture and arrangements;‡ and the prominence given to landscape in the art of the Hellenistic Period seems to show that the idea of and the love for country life was not by any means unknown. But among the Greeks the villa never became an absolute necessity to every man of means and position, whereas by the end of the days of the Republic it had already come to be so regarded by the Romans.

No doubt, the habit began in a practical way from the desire to supervise during a part of the year the cultivation of their country estates, which were worked on a great scale by gangs of slaves, and which, as time went on, were ever growing larger at the expense of the small farms (Mommsen, *History of Rome*, III., 64 *sqq.*), as Italian corn growing was rendered more unprofitable by Governmental importations of cheap corn from the provinces. Then, we know that the Romans considered Rome unhealthy in summer, and found it hard to explain the choice of its site.* Also, it was a noisy, dusty town in summer, from which people were glad to be able to escape. Horace speaks of the impossibility of sleeping on till dawn even—"si et grata quies et primam somnus in horam delectat, si te pulvis strepitusque rotarum, si laedit caupona Ferentinum ire iubebo" (Epist. I., 17, 6; *cf.* II., 2, 72 *sqq.*).† Receptions of clients seem to have begun at daybreak, and the clients themselves had to start well before dawn in order not to be too late to salute their patrons.

And then, again, the Romans had, no doubt, a real love for country life and for scenery—of a sort. The sea coast especially pleased them. From Civitavecchia to Sorrento, with but few interruptions, ran a chain of Roman residences, luxuriously fitted up, of which the remains may still be seen by the explorer of the coast line.‡ But they also loved the Alban hills and the mountain slopes round Tibur and Prænestе, and even the upper valley of the Anio. They had, however, no affection for the wilder side of Nature. Mountain scenery did not appeal to them, except as forming a pleasing background to the view. Such situations as that of Nero's villa at Subiaco (whence came that beautiful headless statue of a youth in the Museo delle Terme), or of Trajan's villa,§ on the road between Subiaco and Alatri, in the Piani dell' Arcinazzo, are not very common.

Prof. Friedländer, in an interesting chapter of his *Sittengeschichte Roms*,‖ analyses the ancient feeling for Nature as manifesting itself (a) in the religious honour shown to springs, groves, caves, etc., (b) in the interest felt for historical sites (notice, for instance, the imitation of the Vale of Tempe in Hadrian's villa), (c) in the sightseer's curiosity about strange natural phenomena. We hear of people travelling to the Atlantic coast to see the tide ebb and flow, of visits to Lake Avernus, and so forth. (d) In the genuine love of country life characteristic of the older and simpler Roman genius, which is expressed with a real and unmistakable sincerity by most of the best writers.

But it was Nature in her most pleasing aspects that they loved, and that is part of the genius of the Italian race. In her wilder forms they did not, could not, understand her: mountain scenery repelled, or, in its sterner forms, even terrified them. Livy talks about the "Alpium foeditas,"¶ the fearsomeness of the Alps; and while mountain climbing in its present form is, of course, a purely modern development, a walk up a high mountain for the sake of a view was rare, except in the case of Mount Etna, and even there the ascent was usually undertaken for the scientific interest of the volcanic phenomena, though Hadrian, we are told, went up it in order to see the sun rise from the sea. It is wrong, in fact, as Prof. Friedländer shows, to attribute to the Romans a feeling for the wild and romantic in Nature. Such a feeling was practically unknown even to the mediæval mind, and, except in isolated instances, is hardly more than a century old. Dr. Johnson's dislike of the scenery of the Highlands is a familiar instance.

It is difficult to say when the habit of a regular "villeggiatura" began among the Romans.

One of the earliest recorded instances of

* O. E. Schmidt, *Cicero's Villen* (from *Neue Jahrbücher für das Klassische Altertum*, Vol. II., 1899).

† The word villa is probably a form of *vícula*, a diminutive of *vicus* (*viculus* does, however, actually occur, in the sense of a little village), and thus means a small hamlet or country house. *Vicus* has the same root as the English wick.

‡ Thuc. II. 65. καλὰ κτήματα κατὰ τὴν χώραν οἰκοδομίαις τε καὶ πολυτελέσι κατασκευαῖς ἀπολελεκότες.

* Cicero, *de Republica*, II., 6: "Locumque delegit et fontibus abundantem et in regione pestilenti salubrem." But notice the existence of ancient altars of the goddess of Fever (Febris) in no less than three places in Rome: "Febrim autem ad minus nocendum, templis colebant (antiqui); quorum adhuc unum in Palatio, alterum in area Marianorum monumentorum, tertium in summa parte Vici longi extat," *i.e.*, on the Palatine, Esquiline, and Quirinal (Val. Max., II., 5, 6). *Cf.* Jordan, *Top. d. St. Rom.*, I., 1, 149; Gilbert, *Gesch. u. Top. d. St. Rom.*, I., 15; Friedländer, *Sittengeschichte*, I⁶, 37.

† Friedländer, *Op. cit.*, I⁶, 27.

‡ *Op. cit.*, II⁶, 108 *sq.*

§ The place is generally called palazzo di Nerone, but waterpipes have been found there bearing Trajan's name (*C. I. L.*, XIV., 3447).

‖ *Op. cit.*, II⁶, pp. 188 *sqq.*

¶ XXI., 43.

an owner of villas belongs to the year 153 B.C., when M. Iunius Brutus is spoken of as possessing estates at Privernum, Tibur, and in the Alban territory.* The name of Albanum soon became stereotyped as signifying a villa in the Alban district, and from it came the name of the modern Albano. With regard to the villas of the last century of the Republic, very interesting and valuable details are given us in the voluminous correspondence of Cicero. What is known about Cicero's own villas has been well put together by Schmidt in the work I have already cited. He possessed at one time and another no less than seven, and it will be interesting, perhaps, to deal with them one by one. The oldest of his possessions was no doubt the villa near Arpinum, in the valley of the Liris, which, with the estate of which it formed the centre, he inherited from his father and grandfather,† and in which he was born. The site of it must be sought on the delta of the Fibrenus, near the church of St. Domenico, which lies on the road between Isola del Liri and Sora, though a good deal nearer to the former (Schmidt, *op. cit.*, p. 9 *sqq.*). No remains of it are extant, but Schmidt reconstructs it mentally from the interesting description given by Cicero to his brother Quintus, then in camp with Cæsar in Gaul, of a visit to his (Quintus's) properties in the same district (*Ep. Ad Quintum Fratrem*, III., 1). The great charm of the villa was the shade and the rich flow of water; streams surrounded the villa on all sides, for it lay between two arms of the Fibrenus at the point where it falls into the Liris. We learn from Cicero's correspondence with Atticus that he constructed a building called Amaltheum after the model of one in Atticus's villa in Epirus—apparently a kind of conservatory or nymphæum, decorated with paintings of trees and foliage—very likely of the same style as the frescoes in the Villa of Livia at Prima Porta. Cicero's next acquisition was a villa at Formia, which he had already owned for some while in 67 B.C. (*Ad Att.* I., 3, 2), and near which he was murdered. Both the villa and the tomb of Cicero are still shown at Formia, but there is no certain basis for the identification in either case.‡

The third of Cicero's villas was his villa at Tusculum, which he bought in 68 B.C. from a certain Vettius; it had previously been in the possession of Sulla and of Q Lutatius Catulus, the builder of the Porticus Catuli on the Palatine, and of the Tabularium also. The site of it has been sought either close under the city of Tusculum, where there is a large villa, known nowadays as the Villa of Tiberius (Lanciani, *Bull. Com.*, 1884, 174), or a good deal lower down, close to the Abbey of Grottaferrata—or even in the very villa, upon the immense substructions of which this abbey is built. The determinant factor in the controversy is the statement that the villa received water from the Aqua Crabra.§ We know from Frontinus's‖ commentaries on the aqueducts of ancient Rome that the springs of the Aqua Crabra were so placed that they could at will be turned into the aqueduct of the Aqua Iulia, and that this was sometimes fraudulently done—fraudulently because (1) the water was inferior to that of the Iulia; (2) it was supposed to be reserved for the use of the villas at Tusculum. Now the springs of the Aqua Iulia are to be sought close to the Ponte degli Squarciarelli, where the roads from Frascati, Grottaferrata, Marino, and Rocca di Papa meet; and so it seems most probable that the source of the Aqua Crabra is to be found higher up the same valley. The springs of the Aqua Crabra are still in use for the villas and the town of Frascati, and the water that feeds the stream known as the Marrana Mariana (familiar to those who have explored the aqueducts near Capannelle) is the Aqua Iulia—though in the early Middle Ages the water of the Crabra was also mingled with it.* It does not seem possible that the water of the Aqua Crabra can ever have been taken up to the hill of Tusculum, for its level is too low, and the identification of the Aqua Crabra with the otherwise unknown Aqua Augusta (for which *cf.* De Rossi, *Ann. Inst.*, 1873, 170 *sqq;* Lanciani, *Op. cit.*, p. 327) is very doubtful, though Schmidt seems slightly inclined towards it.

But there are two other arguments in favour of the older view, that Cicero's villa was to be sought on the hill of Tusculum. One is a passage in a scholiast on Horace, Epod. 1, 29:—"Neque ut superni villa candens Tusculi Circaea tangat moenia," upon which the commentary, as cited by Cruquius, is: "Tusculi superni, hoc est in monte siti, ad cuius latera superiora Cicero suam villam habebat Tusculanam." The statement is, however, rather vague, and the precise meaning of "latera superiora" may be no more than "upper slopes," as distinguished from the plain. The other is the discovery of a brick bearing the stamp M·TVLI in archaic letters in the villa now known as the villa of Tiberius above the villa Rufinella (*C. I. L.*, XV., 2277). But, as Mommsen remarks, at the time of Cicero double consonants were in use, and one would expect to find the cognomen added in the case of a man of senatorial rank; so that, although the brick was apparently found *in situ*, and not lying about loose, the value of this argument also is somewhat doubtful.

Schmidt's return to the older identification must therefore be dismissed (p. 30 *sqq.*). It is, however, impossible to say which of several villas round Grottaferrata is to be identified with that of Cicero.

At Antium Cicero seems to have possessed a house in the town,† since 60 B.C., at least. He had sold it in 45 to Lepidus,‡ and had (apparently instead of it) bought a villa on the promontory (in Cicero's days probably an island)§ of Astura, 10½ kilomètres E. of Nettuno. Here he retired after the death of his daughter, Tullia, in February of 45 B.C., in search of solitude.‖ The place still retains its name, and on the promontory are remains of a large villa, now invaded by the sea, and a solitary tower, in which Conrad of Swabia was confined, inhabited by one or two Customs' officers, who probably have little enough to do.

The remains of the villa are considerable (it was large enough to have a small harbour of its own), and the plan could easily be recovered. If this is the villa of Cicero (as is probable) it has, as we might expect, been reconstructed in later days. In 60 B.C. Cicero also owned a villa at Pompeii, the site of which cannot be certainly fixed (Mau-Kelsey, *Pompeii*, 16), though Schmidt again makes an attempt to do so (p. 53 *sqq.*). After his return from exile Cicero seems to have acquired, in 56 B.C., a villa at Cumae, now buried under the Monte Nuovo;¶ and, in 45 B.C., he bought a villa at Puteoli, with large and extensive gardens, which had belonged to his friend Cluvius, and out of which he hoped to make cent. per cent. on his capital outlay.**

It thus appears that Cicero possessed in the latter period of his life no less than seven villas in different parts of the country—all between Rome and Naples, and on the western side of the Apennines—a fact to be borne in mind in connexion with what was said previously with regard to the Roman ideas of beauty in nature.

The only other writer who has left us a really detailed description of his villas is Pliny the younger, who fully describes those which he possessed near Tifernum Tiberinum (Città di Castello),* and near Laurentum, in two well-known letters (V. 6, II., 17). His villas on the Lake of Como are only briefly mentioned in his extant correspondence, and no remains of them seem to exist. The first of the two is, however, not completely dealt with. Pliny only speaks of the rooms which served for his personal use—of the dining and sleeping rooms which were fitted for each time of day and each season of the year. The villa seems to have been built on the south side of a hill, rising from the foot upwards in terraces, upon which were gardens and several independent buildings, or groups of rooms connected by porticoes or *cryptoporticus*—*i.e.*, galleries above or below ground—the latter being in use for coolness in summer. The whole was arranged with a view to make the best use of the contours of the ground, so that each room might have a good view, and that there might be plenty of choice for the different seasons of the year. Winnefeld (*Jahrbuch des Archäol. Instituts*, 1889, 203 *sqq.*) gives an imaginary plan of the villa, which indicates this well.

The villa on the sea coast, seventeen miles from Rome, and close to the Vicus Augustanus (separated from it by only a single villa) was of quite a different character, being much smaller, and having but little property attached to it. It was, therefore, in plan, more regular and more like a town house, and, as it lay on the flat seashore, the site offered no difficulties. An atrium formed the entrance-hall, and with a small semi-circular court, followed by a *cavaedium* or peristyle, and a *triclinium* (the last projecting on to the sea, of which it commanded a view on three sides), formed the main axis of the house, which must have faced south-west on to the sea, the coast running straight for miles hereabouts, from the mouth of the Tiber to Anzio. To the south-east of the *triclinium* was a group of small rooms reserved for Pliny's own use; the rest of this wing seems to have served for his servants, and in part also for guests, while on the north-west were two fine rooms, behind which, on the north-west side of the peristyle, lay the bath and its appurtenances, and beyond it a view-tower.

Behind the main building, and differently orientated from it, lay a smaller building divided into two parts connected by a long *cryptoporticus*, on each side of which was a garden, and also provided with a view-tower.

We may now, in the light of the evidence afforded by our literary sources, proceed to examine the remains of villas which actually present themselves.

Two kinds of villas were distinguished by the Romans—the *villa rustica*, or farm-house, and the *villa pseudo-urbana*, or country seat. It cannot be perhaps truly said "that examples of the former type are extremely rare"† except in the sense that those which must undoubtedly exist have not been properly observed or planned, especially in the Campagna Romana—where, indeed, there are not so very many buildings (proportionately speaking) that are susceptible as they stand of being accurately planned (with the single exception of water reservoirs, which are of exceptional solidity of construction), though with excavation it would often be extremely easy (see also below, p. 320). For this reason the villa rustica excavated in 1893-4 near Boscoreale is of very great importance, as its plan is perfect and its internal arrangements could be certainly determined. A full description is given in Mau-Kelsey, *Op. cit.*, pp. 361 *sqq.*, and pl. 4. There was a wide entrance for carts into a central courtyard, with a colonnade round three sides of it. The most important room of the house was the kitchen, with the hearth in the middle, which had, of course, an opening in the roof over it to give exit to the smoke (B¹ on plan). And here we see the atrium in its original form, for "atrium" simply means "black room," from the natural accumulation of soot. But in the town houses it was modified; the hearth was taken away and transferred to the kitchen, though the atrium remained the principal room in the house, and the opening in the roof remained as a light hole (for cases where

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* Cicero, *Pro. Cluent*, 51, 141. *Cf.*, *De Oratore*, II., 55, 224.

† His father had enlarged it, as we learn from *De Leg.*, II., 3: "Hanc vides villam, ut nunc quidem est, lautius aedificatam patris nostri studio . . . sed hoc ipso in loco, cum avos viveret et antiquo more parva esset villa, ut illa Curiana in Sabinis, me scito esse natum."

‡ Cicero says (*Ad Att.*, II., 14, 2) that C. Arrius was his next neighbour, and the inscription, *C. I. L.*, X., 6201, if its original position were known, might help in the search for Cicero's villa, as it is in honour of a certain Arrius Salanus, who may have been a descendant of Cicero's friend. But the inscription was, when first known, built into the wall of the garden opposite the villa Rubino (the traditional villa of Cicero), and whence it came is not to be ascertained.

§ *De leg. agr.*, III., 9.

‖ *De aquis*, I., 9

* Lanciani, in *Atti dei Lincei*, ser. III., vol. IV., pp. 321 *sqq.* *Cf.*, De Rossi, *Ann. Inst.*, 1873, 208 *sqq.*

† *Ad. Att.*, IV., 8*a*, 1.

‡ *Ad Att.*, XIII., 47*b*, 1.

§ *Nibby Analisi*, I., 269.

‖ *Ad Att.*, XII., 47 (40), 3.

¶ Beloch, *Campanien*, 175; Schmidt, *Op. cit.*, 44.

** *Ad Att.*, XIV., 11, 2; Schmidt, p. 50 *sqq.*

* *Ep. vi.*, 1, 4.

† Mau-Kelsey, *Op. cit.*, p. 361.

the atrium was completely covered by a roof (are very rare). This had not been its original use; at first it had been merely a small hole to let out the smoke, light being taken from windows in the *alae* (wings), two deep recesses in the side of the atrium. But in town houses, where light could not be taken from the sides, the *alae* lost their original use, and were a mere survival. The *compluvium* became larger, and below it was placed a basin, the *impluvium*, to take the rain water which it admitted.

In the Boscoreale villa we find grouped round the courtyard, on the north (besides the kitchen), the bath, sleeping-rooms, and some smaller rooms, including a bakery and a stable in the north-east corner, which could only be approached through the kitchen. On the east was a room with two wine-presses, and on the south a courtyard full of earthenware vats (large dolia) for the fermentation of wine, and rooms containing an oil-press, an olive-crusher, and a handmill; besides some small sleeping-rooms—for slaves perhaps—the proprietor living probably in the upper story, and having his bath on the lower.

Similar villas have been found in the same district;* but in the Roman Campagna we have practically no record of them, though it is probable that many of the smaller buildings, of which remains are still to be seen, belong to this class. Not by any means all the ruins of villas in this district display wealth of marble decoration, and some seem to have a simple plan, and show signs of a comparatively early date, such as construction in masonry of large rectangular blocks of stone. Press beds of oil-presses and remains of handmills are often found among them; but the exploration of such buildings has never been properly undertaken.

The Lugari excavations, at the fourth mile of the Via Appia, furnish an exception, but there the main building was a villa of the more luxurious kind (see below), the farm buildings being smaller. There is, however, another villa much older than this, belonging apparently to the Ist century A.D., which has not, as yet, been completely excavated, the plan of which, when recovered in its entirety, may prove instructive.

As Winnefeld remarks (*Jahrb.*, 1891, 201), Vitruvius gives us surprisingly little information as to the arrangements of Roman country houses of the more luxurious sort, only mentioning them briefly (VI. 8) in connexion with the variations from the type of the town house which should be introduced—the atrium, he says, should not be near the entrance as in a town house, but first should come a peristyle, and then the atrium, with paved porticoes around it with a view on to the palaestra and the garden walks. To him, such a building was merely a town house removed to the country, with the additional advantage of the absence of neighbouring buildings belonging to other owners.

They have, as a fact, as far as we can tell, no very regular plan, this depending on the individual taste of the owner and his architect and the peculiarities of the site selected.

We see this very clearly in the villa of Hadrian, where the buildings are most unsymmetrically disposed, and the grouping of rooms round a peristyle seems to be carefully avoided (*Ib.*, p. 202).

This is, it is true, owing to its exceptional size rather an extreme case, and, as a rule, where the site permits of it, a peristyle, or system of peristyles, forms the core of a villa.

A frequent addition in larger villas, and especially imperial villas, was the stadium. We find it in Hadrian's villa, near Tivoli, at Settebasi (very likely another of Hadrian's country houses, certainly dating in the main from his time), at the villa of the Quintilii, at the villa of the Gordiani at Tor dei Schiavi, and so forth. There is also a rather smaller form of it in the large villa, the remains of which have been laid bare by the Lugari family, just beyond the fort on the Via Appia Antica. Of this villa, as it has been completely excavated, and is easily accessible from Rome, it may be well to speak for a moment (*cf.* especially *Not. Scav.*, 1887, 277). It is approached from the Via Appia by a private road, which was in later times completely blocked up by the tomb attributed to S. Urbano, which was planted upon it. The road leads straight up to the vestibule, which has not the form of an atrium, but is just an ordinary room, on the south-east side of the peristyle, which forms the centre of the house; on the right are the baths and living rooms; on the left the entrance to the stadium; and on the opposite side of the peristyle to the entrance are other rooms, one of which contains several dolia *in situ*, and must have served as a store-room.

So far, villas on the plain have mainly been dealt with; but we also have to discuss those which are built upon hillsides or hilltops, and therefore upon artificial terraces, and have not, consequently, so much room for the development of their plan from back to front, though their lateral extension is more elastic. These are to be found more especially in the Alban Hills and at Tivoli. Here we sometimes find the peristyle more or less suppressed: the successive long, narrow terraces rising one above the other have detached buildings upon them, but were mainly intended for gardens, the palace generally occupying the highest terrace of all, and often having but one frontage of any importance. The so-called villa of Ventidius Bassus, at Tivoli, has three such terraces, nearly 200 paces long, but with a combined width of only 150 paces fronting west. At the north-west corner is thrown out a distinct rectangular building, at quite a different orientation, rising on arched substructures to a considerable height, which, no doubt, served for the enjoyment of the view.*

Rather a different type is represented by the villa of Quintilius Varus, where the site is not a steep hillside, but the top of a projecting mountain spur, and there is more than one available frontage. Here, by means of large substructures supported by arches, in which are enclosed *cryptoporticus*, a very large rectangular area, some 200 yds. by 70 yds., has been secured, upon which, no doubt, the main palace stood. Upon the lower teraces were gardens with fountain basins, statues, and so forth.† But villas of these two kinds, which are very common in the hill country, are not often preserved to such an extent that their plan can be determined—or, perhaps, one should say that they have never been systematically examined with that object.

Considering the number of villas of which remains are to be seen in the neighbourhood of Rome, it is quite astounding that so little should be known about their internal arrangements. Most of the larger ones have been ransacked in the search for works of art. The work was carried on with especial activity in the latter half of the XVIIIth century—very largely by Englishmen and Scotchmen, the Scottish painter, Gavin Hamilton, being the most successful of all the treasure seekers. But, while the museums of Europe have been enriched by the results of their excavations, the scientific spirit was entirely absent.

We have at most scanty information as to the sites on which their discoveries were made and lists of the statues found in each case, but there are not, as a rule, details of the less important objects found, and in no case, I think, have we a plan of the buildings among which they worked. The case has been the same in more recent times—so much so that a German archæologist, in an attempt to illustrate a group of Pompeian landscapes by the actual remains of the country houses they represented, could only point to two examples of Roman villas in the neighbourhood of Rome itself of which the plan was accurately known—the villa of Hadrian near Tivoli, and the villa of Voconius Pollio, the former of which is far too large to be considered as typical of its class, while the remains of the latter have been almost entirely obliterated by cultivation during the last few years.‡ There are one or two other cases besides those he mentions; both the villa of the Quintilii, on the Via Appia, and the villa known as Settebasi, on the Via Latina, have been planned by Canina in his *Edifizi*, but his drawings are reproduced upon a very small scale, and are not up to modern standards of accuracy; they contain, besides, a certain amount of conjectural restoration.

As I pointed out in the *Classical Review* for February of the present year, the rapid spread of cultivation offers an opportunity to the Italian Department of Antiquities, of which it has so far not availed itself. It would be comparatively easy, when a piece of pasture or waste land is being converted into corn land, garden, or vineyard, to so direct or supervise the operations of agriculture that the plan, at any rate, of the buildings discovered might be recovered. The transformation once completed, the cost of excavation becomes prohibitive—if, indeed, the buildings have not entirely perished in the process, as is too often the case, without any protest coming from or even any notice being taken by the responsible authorities. It is true that it is the cultivator's business to give them notice of any discoveries he may make; but it is by no means to his interest to do so, as the authorities themselves acknowledge.

The destruction is probably greater in the low-lying districts than in the hills, though here the flat surfaces presented by the immense terraces upon which the villas stood have served for centuries for the vine, corn, or olive growers' use, and the buildings which stood upon them have probably been in large measure obliterated, though the massive retaining walls still resist the ravages of time. They are most picturesque objects in themselves, and are very interesting to the student of Roman construction.

In the district of Tivoli especially he may observe many examples of the survival of polygonal or Cyclopean masonry in the platforms of villas. The idea that such work is of necessity prehistoric is now being given up; attempts to date it according to its roughness of style or the reverse are met with the rejoinder that at Norba careful examination of the city walls has disclosed the fact that the parts best constructed are precisely those which are indispensable for defensive purposes, while excavation has revealed the existence of undoubtedly Roman objects beneath the foundations (*Not. Scav.*, 1901, 548 *sqq;* 1903, 259).

Again, at Circeii the style of the inner and outer side of the same piece of wall varies infinitely.* Further, a great deal of such work is found in Roman high roads, and when finally we get it (it is true, in rather a perfect form), as at Grotte Torri, in the Sabine territory, not far from Cures, where, in the platform of a very large villa, some 90 yds. square, it serves on one side as the outer facing of a 4-ft. wall, on the inner side of which (faced with *opus incertum*) is a *cryptoporticus*, the wall being pierced by windows to light the gallery, we are compelled to admit its persistence into Roman times.†

The origin of the style seems to depend on the material at hand and the skill of those who had to work it.‡

The first man who built a wall undoubtedly heaped up loosely the first stones that he came to. After a little experience, he discovered that by a little careful fitting he could get the base of the wall to take less room and the wall itself to stand more easily, especially if it were standing free and not merely a terrace wall.

Then he would begin to smooth the inner edges to secure closer contact, and if the wall was for defensive purposes the outer also, so that it might be less easily scaled. If the material he had to use was hard, he would not attempt to square the blocks, but would leave them polygonal, or roughly rectangular, if (as often) the stratification led to their fracturing in that way. If, on the other hand, it were softer or more tractable, he would find that it was easier and better to use rectangular blocks; for even in the walls of Circeii, which are of well-built polygonal work, it is necessary in

Not. Scav., 1897, 398; 1898, 419.

*See *Papers of the British School at Rome*, iii. (in the Press).

†The site of the villa of Voconius Pollio, excavated in 1884, presents somewhat similar characteristics. The plan of the original part of the villa was recovered. It is interesting, and rather more in conformity with that of the town house than usual. We can recognise all the parts of the regular plan. On the right, however, was later added a parallel wing, almost entirely occupied by baths and servants' rooms and store-rooms. (*Bull. Com.*, 1884, 141 *sqq.*)

‡*Jahrbuch des Instituts*, 1904, 3.

**Mélanges de l'Ecole Française*, 1905 (an article by the present writer now in the Press).

†*Papers of the British School at Rome*, iii.

‡Durm., *Baukunst der Etrusker und Römer*, 15, but *cf.* Noack, *Röm. Mitth.*, 1897, 183.

order to give them stability that the thickness should decrease considerably from base to top, whereas with walls of rectangular blocks this disadvantage does not occur.

But for terrace walls "Cyclopean" work might (and did) persist—as frequently in the Tivoli district (in limestone) and in a few isolated cases in the Alban Hills (in selce)—where tufa and peperino are plentiful, and where therefore we generally get concrete with a facing of *Opus reticulatum* or *incertum*—and a great many round Terracina, Fondi, and Formia (in limestone). And it is still in use for terraces for cultivation in many lands—I have even seen it used by Swiss railway engineers as recently as last year. It seems somewhat far-fetched to trace such a natural development to foreign influence, and its native character may be indicated by the fact of its late persistence. It is probable, further, that from it, by the stones gradually becoming smaller, *Opus incertum* was developed, and by their regularisation *Opus reticulatum*—a style of facing which must have been so troublesome and laborious that one is otherwise rather at a loss to explain it.*

A few words, in conclusion, as to the main groups of villas round Rome. We find them in the lower Campagna on all sides of the city, but especially in the direction of Tivoli, Palestrina, and the Alban Hills—and more than ever along the Via Appia; and then there are the hill groups themselves.

The character of the different groups has already been illustrated. At Tivoli we find more frequently (not exclusively) terraces on steep hillsides facing on to the Campagna, protected thus at the back from cold winds and commanding fine views; in the Alban Hills, where the outlines are more rounded, we find great platforms occupying hill-tops or gentler slopes. For some reason, antiquarian interest began earlier in the Tivoli district, and ever since the XVIth century nearly every villa has had its traditional name. An exhaustive examination has shown that in not more than two or three cases is such a name trustworthy or even probably accurate; it generally rests upon a misinterpretation of some passage in a classical author, or the distortion or misapplication of a local name, or reliance upon an inscription which is either a forgery or, if genuine, affords no evidence as to the name of the proprietor of the villa in or near which it was found. The testimony of inscriptions on water-pipes is of the greatest value, but very few of them have been discovered in the Tivoli district, whereas in the Alban Hills (where traditional nomenclature had not sprung up to such an extent) they are of great service.

A reference must be made to the water supply of these villas. It was the object of the greatest care; if one of the great aqueducts could not be tapped, a private aqueduct would be constructed, or, failing the presence of springs, huge rain-water tanks would be built. The reservoirs are among the most conspicuous remains in the Campagna.

Owing to their great solidity, they resist far better than other remains the wear and tear of time. Where a regular supply was available, they are, as a rule, closed chambers, of varying size, the larger being, as a rule, in part or entirely subterranean. One of the latter, which I discovered some years ago on the northern slopes of the Alban Hills—a wild fig-tree in the middle of an open down, which proved to be growing out of a hole in the roof, led me to the spot—has eight arches in one direction and five in the other, each with a span of 10 ft., supported by pillars 3½ ft. square.

Another, further up among the hills, consists of two chambers, each 137 English ft. in length by 11 ft. in width and 16½ ft. in height, and divided by a partition wall 3 ft. thick, which is pierced by eleven arches, each 7¾ ft. in height and span (*Papers, cit.*, i., 253, *n.* 1).

The smaller reservoirs, on the other hand, are often above ground—sometimes raised upon lofty substructures, so as to give a higher pressure to the water. They are sometimes single, sometimes divided into two or three chambers, which, when without intercommunication, may be conjectured to have served for the supply of different proprietors.

Where rain-water had to be relied upon, on the other hand, open reservoirs, often circular in shape, were in frequent use. Many specimens of them may be met with in the neighbourhood of Montecelio and S. Angelo—the two small villages which, clustering upon their conical hills, form a prominent feature in the landscape to the north-west of Tivoli. One which I have planned is in the form, not of a true ellipse, but of a rectangle with apsidal ends; its extreme length is 109 ft., its extreme width 51½ ft., and its depth about 9 ft.

Both classes of reservoirs are lined with *Opus signinum*, a kind of cement of special strength in which small fragments of brick are freely used, and the angles are almost invariably filled with a quarter-round beading of the same material. The floors are, as a rule, of considerable thickness (1 ft. or more), and often have a layer of herring-bone brickwork below them.

These notes may, I hope, be some slight assistance in the mental reconstruction of the Campagna as it was. Professor Lanciani has drawn a picture of this huge garden all round the city in Chapter X. of his *Ancient Rome*. Until lately desolation reigned supreme over the Roman Campagna, but now cultivation is spreading fast, safeguards against the malaria of summer have been successfully adopted, and perhaps the new law of the Bonifica,* if operative, may restore it to its pristine condition. If this is to be so, now is the archæologist's last opportunity. Cultivation is to be welcomed on every ground, except that it leads to simultaneous discovery and destruction, and restricts the field of free and unquestioned ramblings.

THOMAS ASHBY, JUN.

THE MITCHELL LIBRARY COMPETITION, GLASGOW.

BEFORE the beneficence of Mr. Carnegie induced Glasgow to adopt the Libraries Act, her chief collection was one that had as a nucleus the books left by a citizen, Mr. Mitchell. It has been, and will remain, a reference library, and now grown till it consists of some 80,000 volumes, and housed in transformed premises that are insufficient, the proposed removal westwards to a site adjoining the St. Andrew's Halls—municipal property—has been the occasion of a recent competition. The plans were sent in in March, the decision was made in July, only now are they exhibited; but the delay is about the only ground of complaint in a well-organised competition. The drawings asked were few, of a fixed size of sheet—and that a small one: perspectives were prohibited. The assessors appointed were Mr. McDonald, the City Engineer, and Mr. John Keppie, F.R.I.B.A., President of the Glasgow Institute of Architects, who prepared and issued the conditions timeously, and, further, sent out full replies to the particularly long list of queries addressed to them. Seventy-six sets were sent in, and a local architect has won, and had the work given him to do.

The site is almost a rectangle, about 192 ft. by 106 ft., open on all sides, with frontages to three streets; the fourth face is towards St. Andrew's Halls, some 50 ft. away, and this space will be available for future extension: but competitors, rather strangely, were not asked to show how this was to be utilised. The site is fairly level, falling some 4 ft. from the north-east corner. The main requirements were:—A reading-room, with a floor area of 5,400 sq. ft., to hold 300 readers of books; students' and ladies' rooms for fifty readers in each, all on ground floor, to be served from 100 ft. length of counter space; and a book stack holding 30,000 volumes in ordinary use; storage for an additional 300,000 being found above and below. On an upper floor the magazine-room, to hold 200, with an area of 3,000 ft., and the Jeffrey collection of books requiring also 3,000 ft. Smaller rooms were required for Glasgow and Burns' collections, staff accommodation, and city librarian's office. The conditions gave 40,000*l.* as a reasonable cost. The entrance was asked for near the north-east corner, a rather unfortunate suggestion, as it is now proved that a central entrance in the east front is the suitable place. At the same time the conditions were offered as suggestions only, and competitors were invited to present their own ideas.

The types of arrangement illustrated are (1) the reading-room placed centrally, the entrance then may be on the axis of the east façade; (2) the reading-room to the east front with a high ceiling, or (3) with apartments overhead; (4) reading-room placed along the narrower front, north or south. In nearly all these cases, the book stack is toward the back (west face), but in a few exceptions it is to the front for one or more floors. The selected first four designs have each a central reading-room, top lit. The main entrance of two is placed in the centre of the east frontage, and one, obviously to meet the promoters' suggestion, places it to one side to the detriment both of convenience and appearance.

The accepted design is by Mr. Wm. B. Whittie; it has this side entrance; in the centre is a staircase, and the positions might with advantage be transposed. The reading-room is entered at one side, but a screen is surely wanting that would at once protect some of the readers from the traffic and ensure that, on leaving, the counter would be passed to hand in books. Access to students' and ladies' rooms is direct, but they, too, may be left without passing their counters. The book stack arrangement is compact, but the circular iron stairs are objectionable. In the basement, rather oddly, the part of the area taken for books is the centre rather than round the fronts, where better light would be had. This basement floor averages about 5 ft. below the pavement, favourably comparing with others needlessly excavated. On the first floor the Jeffrey collection and magazine-room balance each other, and, as with all the plans that adopt a large central hall for reading-room, the larger cubical contents given the book reader there contrasts with that allowed the magazine reader. The variation from true rectangularity of the site is carried into the reading-room, and where the coved roof rises the twist would be manifest. It is hardly conceivable that the architect seriously proposes to build it as shown, especially when the inequalities could be thrown into the corridors for staff service adjoining. The elevations to the two shorter fronts are alike, and of dignified Renaissance treatment; an upper order of three quarter columns, containing two stories of square windows, over a rusticated basement; cornice and balustrade give an unbroken skyline without tower or extraneous feature. The façade to the longer face is unsatisfactory from the number and irregularity of the window openings. No doubt when the reading-room for quietness' sake is kept away from the outer wall it is not easy to suggest its presence, but this in other designs has been done, and certainly expression in the elevation could have been given to the rooms next in importance, the Jeffrey and magazine departments; their presence is not suggested, and the three fronts might as well suit a block of offices. It is a great pity the adjudicators have had so prosaic a conception of their opportunity. Their judgment is in accordance with the programme of the competition, and the result will be a comfortable and suitable building, but one entirely lacking in distinction or architectural interest either to the visitor within or to the passer-by. The cost as revised is slightly over the stipulated sum.

The first premium of 100*l.* is gained by Mr. John Arthur, also a local architect. Access to the Glasgow and the Burns' collections is only through the central reading-room. The entrance is placed to the side, as suggested, but it is hardly important enough. The book stack is shown enclosed, and so fire-resisting, with stone service stairs, both good features; the basement area is very largely made use of for book storage; there, too, are located the staff wrk and mess rooms. The magazine-room in comparison with the reading-

* On the other hand, it must be recognised that *in certain cases* (such as the city walls of Fondi) there is an intentional avoidance of horizontal and vertical joints, and a striving after polygonal work. It is for this class of structures that the term "polygonal" should be reserved, "Cyclopean" being applied to the rest. I have discussed the question more fully in *Mélanges, cit.* Round Tivoli, again, there are cases in which it is obvious, from the careful rustication of the blocks, that the Cyclopean style has been intentionally kept up (*Papers*, i., 150).

* This is a measure recently passed, intended to bring about the substitution of cultivation for pasturage in the immediate neighbourhood of Rome. It offers advantages to those proprietors who adopt its provisions, and proposes to apply compulsion to those who refuse.

room is small. The elevations of this design are better than of the accepted one, especially the east front; the style is Renaissance of a freer and lighter character than Mr. Whittie's.

The second premium of 75*l.* is awarded to Mr. S. K. Greenslade, of London. This set has perhaps the most beautiful plan in the collection. A fine central reading-room is separated from the street by a shallow vestibule; the entrance is on the axis of the main front, and enclosed passages on each side of reading-room lead to the counter and to ladies' and students' rooms without any crossings. Filed, unbound periodicals that were desired on ground floor are placed in the basement, but any inconvenience is much more than compensated for by other excellencies. It is most unfortunate that the sections are unfinished, the longitudinal little more than begun; but in the cross view sufficient indication is given of refined and most careful design. The elevations are not very well presented; lead-lines in window might stand for metal grilles, and only confuse. It is a pity that the author has not done his conception justice in its delineation, and this for lay critics puts it at a disadvantage; but architects' assessors should be able to appreciate its merits, and these quite entitle it to first place among the premiated sets, if not of all those submitted.

The third premium of 50*l.* is awarded to Mr. J. R. Rhind, who in recent competitions has won some half-dozen of the small district libraries. The utilitarian necessities have been better met than by the first two, but the architectural treatment within is pinched and common-place; externally two towers are a concession to esthetic claims. The doorway is in the centre, with staircases on either hand to magazine-room and to Jeffrey collection; side passages give access to the counter and to students' and ladies' rooms, but there is still a little crossing, and these last have less privacy than is desirable. On paper the surveillance by the counter attendants over readers appears more effective than it would be in reality. This notion of surveillance seem to have had given it an exaggerated value, for plans otherwise excellent are set aside because of columns or wall screening readers. Even if past or anticipated delinquencies justified a detective-like oversight, observation from the counter at the far end of a large room is quite ineffectual to prevent a book's maltreatment. The cost of Mr. Rhind's design is put at 48,000*l.*

If the unfinished state of Mr. Greenslade's drawings rendered it ineligible for first place, then No. 63 or No. 33 (Messrs. Thomson & Sandiland's)—only some of the sets have names affixed—might fairly take the position. The former has the ground floor occupied with public-rooms, so subordinate parts suffer, and it is a blemish that two streams traverse the great reading-room to reach the counter; all the same, it is a monumental plan. The elevations are expressive and imposing, rather florid on the sides perhaps, and four cupolas seem excessive. No. 33 has a fine central domed reading-room, with side passages; access and exits there and in students' and ladies' rooms are particularly good, without any crossings, and readers must pass counters when leaving. By contrast the magazine-room suffers, because of apartments over; it is low in ceiling and only side lit. The main elevation to the east front is good, and, though a vestibule interposes, the central hall behind is well expressed in the façade, but the side elevations are inferior. No. 60 is an excellent plan, with side counters to the reading-room that suits the public convenience, if it causes more walking for the attendants. No. 15 has counters for the passing in of books after use, an arrangement that has much to commend it, and as here employed ensures good surveillance; the elevations are very simple and restrained. Several designs that have the entrance to one side emphasise it by a tower, thus No. 2 and No. 13; the former has a well-considered plan and effective composition. Not a few of the reading-rooms have but 25-ft. high ceilings, with an apartment overhead; this occasions considerable staircase travel, but the disparity in bulk between the rooms for books and for magazines noticeable in other arrangements is obviated. Of this type No. 19 is a good example; the upper wall is recessed, with architectural advantage, but it occasions pillars to support it in the reading-room, and so incurs the prejudice of the assessors. No. 23, on similar lines, has a couple of small towers that very happily tell in the design.

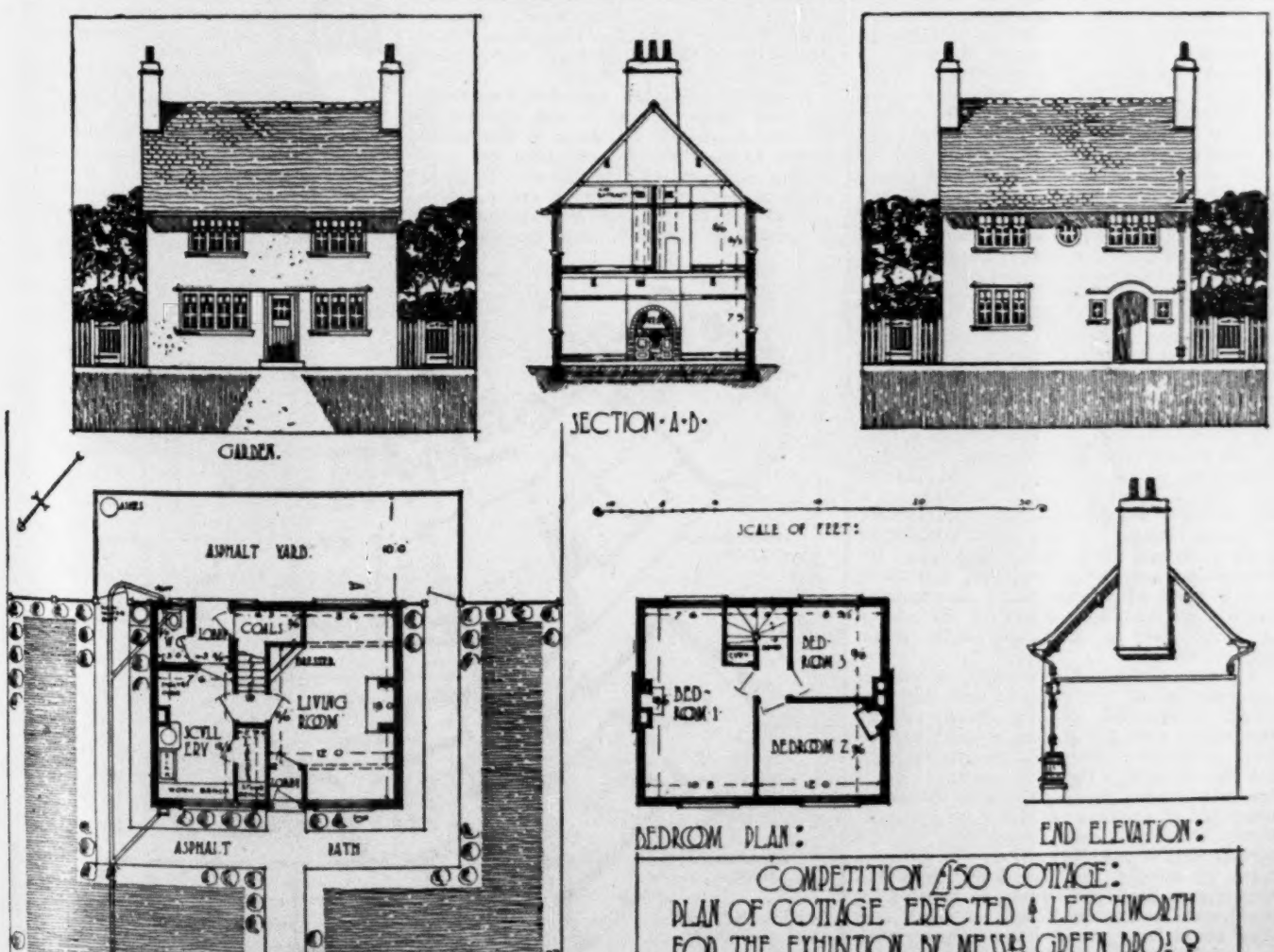
Designs with domes are—No. 3, where it overpowers; No. 1, where it competes with Corinthian porticoes themselves sufficient to magnitude and richness. No. 9 is of moderate size, part of a design that is one of the best and finely illustrated; the scale drawing, however, is superfluous, while the back elevation is good, but needlessly expensive for its position.

No. 10 is the most grandiose of all; a fine design, but quite beyond the expenditure proposed. Half a dozen or so adopt a Greek treatment, carrying out the lines of the adjoining hall, that is also the property of the town; but all the others, with three exceptions, are studies in Roman classic or Renaissance—there is not one example of "new art." The exceptions are No. 71, in Romanesque manner; No. 66, a picturesque treatment of late Gothic; and No. 48, apparently by the same hand, has a touch of Byzantine feeling, both clever, but hardly serious enough.

PRIZE COTTAGE: CHEAP COTTAGES EXHIBITION.

THE illustration shows the house, No. 14 in the catalogue, to which the prize of 100*l.* has been awarded in Class I., for 150*l.* cottages. It is one of the best exhibits, both in a practical and picturesque sense; and the jurors say "We have satisfied ourselves that it has been built for 150*l.*" Has been, perhaps; but will it be elsewhere? This is what we said of it in reviewing the exhibition:

"Messrs. Green Brothers exhibit a cottage (14) designed by Mr. Houfton, of Chesterfield, which has a great deal to recommend it. The walls are of



9-in. brickwork, covered by white cement roughcast, with green-painted woodwork; the interior fittings are simple and solid (the circular window on the staircase ought to be made to open), and the whole in good taste. This is stated to have been built here for 150*l.*; but then comes the note "can be duplicated" (built somewhere else) "for 175*l.*, including profit, architects' fees, and men's travelling expenses"; so that this cannot be regarded as a 150*l.* cottage."

However, it is a highly creditable exhibit, and we are glad to congratulate the architect concerned on his success.

THE JOINT COMMITTEE ON WATER REGULATIONS.

THE Joint Committee on Water Regulations, which comprises representatives of the majority of the chief water undertakings of the kingdom, the Royal Institute of British Architects, the British Association of Waterworks Engineers, and the Plumbers' Company, met recently at the Guildhall, London, to consider the Report of the Sub-Committee appointed to deal with the codification of the existing water regulations and the preparation of a Draft Code of Model Regulations, with schedules of details of fittings, materials, and workmanship, prepared by separate sub-committees, designed to secure more uniform regulations and prevent the present avoidable waste of water.

Dr. Robert Crawford (Glasgow) presided, and among those present were Mr. Searles Wood, representing the Royal Institute of British Architects, and Mr. Charles Hudson, representing the Plumbers' Company.

The Report, in reviewing the general position of the public administration of the supply of water for domestic and trade purposes, called attention to an analysis of the practice of fifty-four of the principal water undertakings of the United Kingdom, supplying an aggregate population of upwards of twenty millions, showing that the regulations drawn under the various enactments when seen together presented almost endless variety and absence of plan, causing grave inconveniences to consumers. It was pointed out that the information furnished for the use of the Committee also showed extreme variations in the rate of consumption of water in different places and estimates of preventable waste amounting to upwards of one-third of the whole supply.

It was stated that at an early stage of the Committee's deliberations a general meeting of manufacturers of water fittings of the kingdom was called, whereat the advantages of standardisation, from the manufacturers' point of view, were considered, and representatives of the principal firms were elected to assist the Committee in the discussion of technical details. The value of standardisation was recognised by the Committee, not only for its bearing on economy in the cost of manufacture and efficiency of working, but on account of the convenience of uniformity to consumers. With that object the Committee had standardised the simpler types of fittings in common use which were found to cause the principal waste of water and inconvenience to consumers, and recommended that the standardisation of other fittings should be dealt with by a permanent Standards Committee, which might by its investigations and reports exercise a useful influence upon the practical development and improvement of water fittings. It was pointed out that much waste and inconvenience was caused by incompetent men being employed, and there was a want of a recognised standard of qualification for plumbers and for the quality of their work in connexion with water supply.

Alderman Gainsford (Sheffield), in moving the adoption of the Report, said that the Local Government Board's model set of regulations were antiquated, so that various local authorities and water companies were not able to look to them for guidance. Consequently, those authorities and companies were forced to draw up their own regulations, with the result that they took a certain form in one place and quite a different form in another. It was hoped that the Committee's draft code would be adopted by the Local Government Board, in which case they would have provided the company with a model set of regulations suitable for present-day requirements. Of course, it would always be open to different authorities to make small modifications needed for local purposes.

Mr. Searles Wood (Royal Institute of British Architects) seconded the motion, and said that architects welcomed the opportunity of taking a part in the framing of regulations more equitable to the consumer and more efficient from the point of view of the water authorities.

The Report was adopted, and a draft model code of regulations to be observed by consumers, with schedules of technical details for the guidance of plumbers and others carrying out work was approved, and it was resolved to submit it to the Local Government Board with a request that the Board would consider it with a view to its general adoption.

Committees were appointed for the further standardisation of fittings and materials used in the distribution of water, and for the publications of the reports and findings of the Committee, finance, and general purposes.

Fifty Years Ago.

SUGGESTIONS FOR LONDON.

I TAKE the liberty of offering to your notice a few suggestions.

I would propose first, a scheme which might be called "A Small Public Thoroughfare and Minor Improvement Scheme," for the purpose of relieving the principal streets of much of the traffic which is continually blocking them up, by simply converting many of the existing courts and alleys into small streets or thoroughfares. We want small outlets to take away the light traffic, such as cabs, carts, etc. For example, Ludgate-hill would be eased a good deal by throwing open the Broadway, Water-lane, Little Bridge-street, etc. Drury-lane and Covent-garden theatres would also be materially benefited by converting what is now called Vinegar-yard and Marquis-court into a small street, which could be done by merely pulling down a few houses.

Again, there are many good streets existing which are quite disfigured, because a few houses are suffered to remain projecting a great way before the adjoining ones, such as St. John-street, Smithfield, Cursitor-street, Hanway-street, Rathbone-place, Sutton-street, Great Wild-street, and many others all over London.

While discussing the desirability of throwing back houses, I wish to ask whether the Act which compels all shops in the leading streets to be thrown back, does not apply equally to streets of every kind? There are many streets, particularly in the outskirts, built as private houses, with two or three feet of ground in front (in some cases called a garden), afterwards converted into shops, and the shops built right over the front bit of ground, instead of being carried back flush with the brickwork of the house, rendering such neighbourhoods very unsightly.

All these evils might be remedied by a general inspection of London, without any surveying, and if undertaken by the various Metropolitan Improvement Committees, such nuisances as Middle-row, Holborn, would no longer remain.

I think, likewise, the backs of houses ought to come under a general inspection, and persons should not be allowed to choke up every bit of ground they have with workshops, etc. In my opinion, every house should have a space of ground equal to its own superficial area unbuilt upon, and every block of buildings should have a right of way or public footpath carried through the back.

Under the head of dirty property, I would advise a general clearance of all back slums, such as the purlieus of Gray's Inn-lane, etc., allowing but a bare compensation for the same, and the tenants of such nasty places should go to the outskirts of the town to find a lodging.

I will now propose a scheme (a novelty in its way) which, if carried out, would be a great boon to a large portion of the public who seem to be forgotten altogether, I mean the children, and that is nothing more nor less than the establishment all over London of small public playgrounds. An excellent opportunity offers itself in the closing of all metropolitan graveyards, and some of these might be fitted up with every kind of gymnastics suitable for both boys and girls. I am sure it would be hailed with delight by a large portion of the inhabitants of London, if street music of every kind were restricted to these playgrounds. A. B. C.

—*The Builder*, September 22, 1855.

Illustrations.

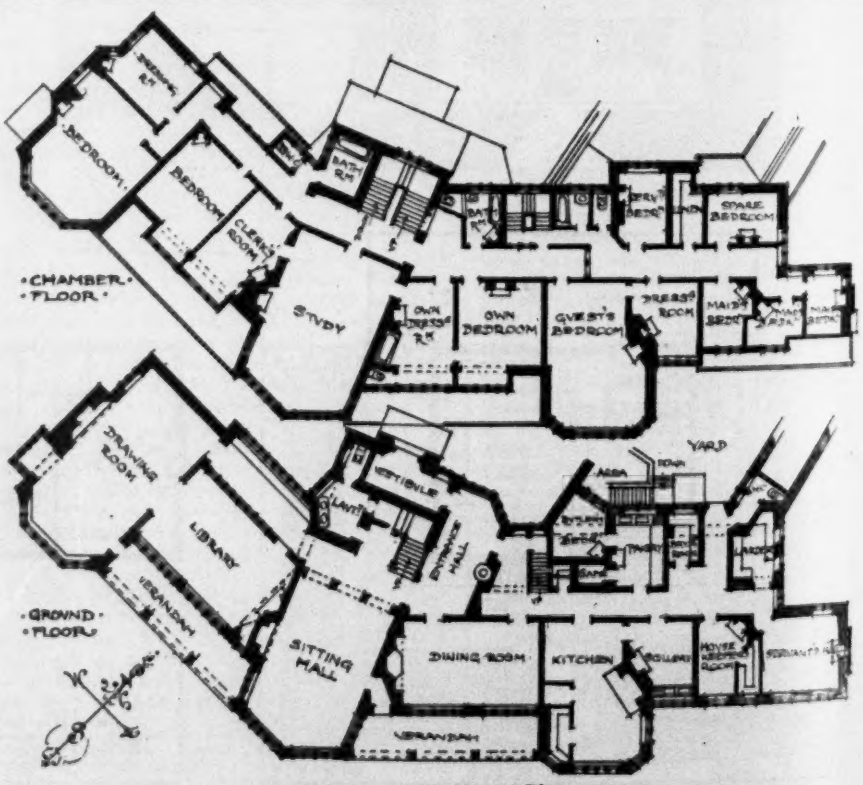
HOUSE NEAR DUBLIN.

THIS house is being erected at Foxrock, near Dublin, for Sir Horace Plunkett, from the designs of Mr. W. D. Caröe.

The materials are local granite and rough cast, with oak windows, and the roofs will be covered with Precelley slates. The builder is Mr. Kieman, of Dublin.

The drawing of the garden front was exhibited at the Royal Academy.

In consequence of Mr. Caröe's absence abroad we are unable to give fuller particulars of the work.



House near Dublin. Plans.

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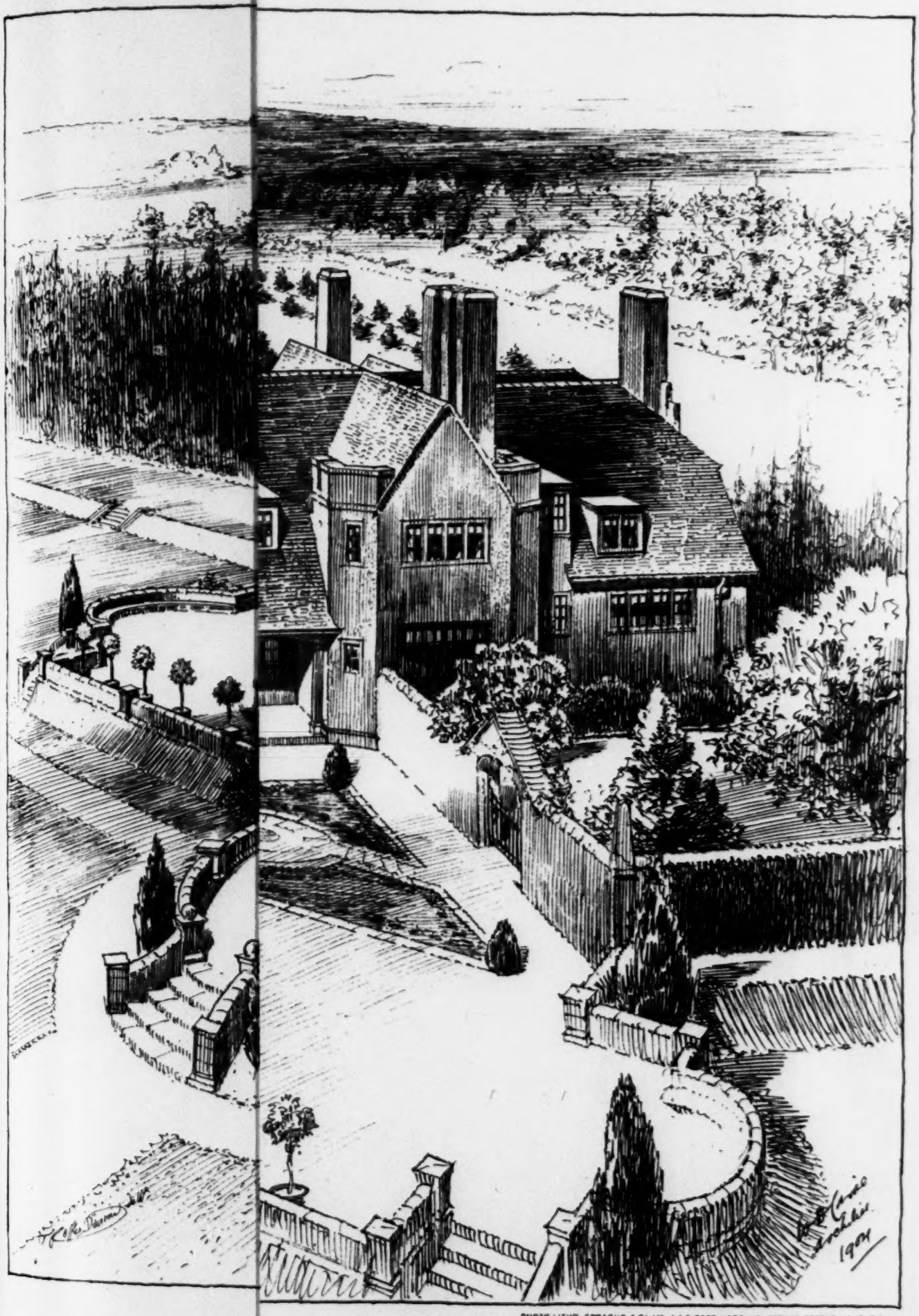

PHOTO LITHO. SPRAGUE & Co LTD 4 & 5, EASY HARDING STREET, FETTER LANE, E.C.

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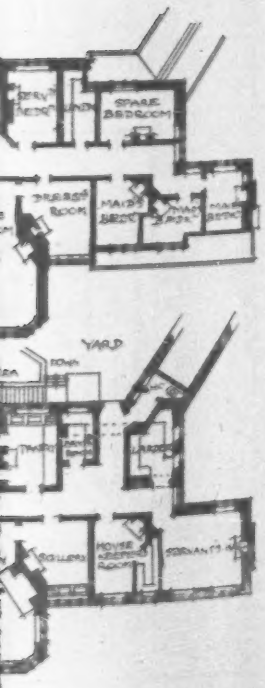
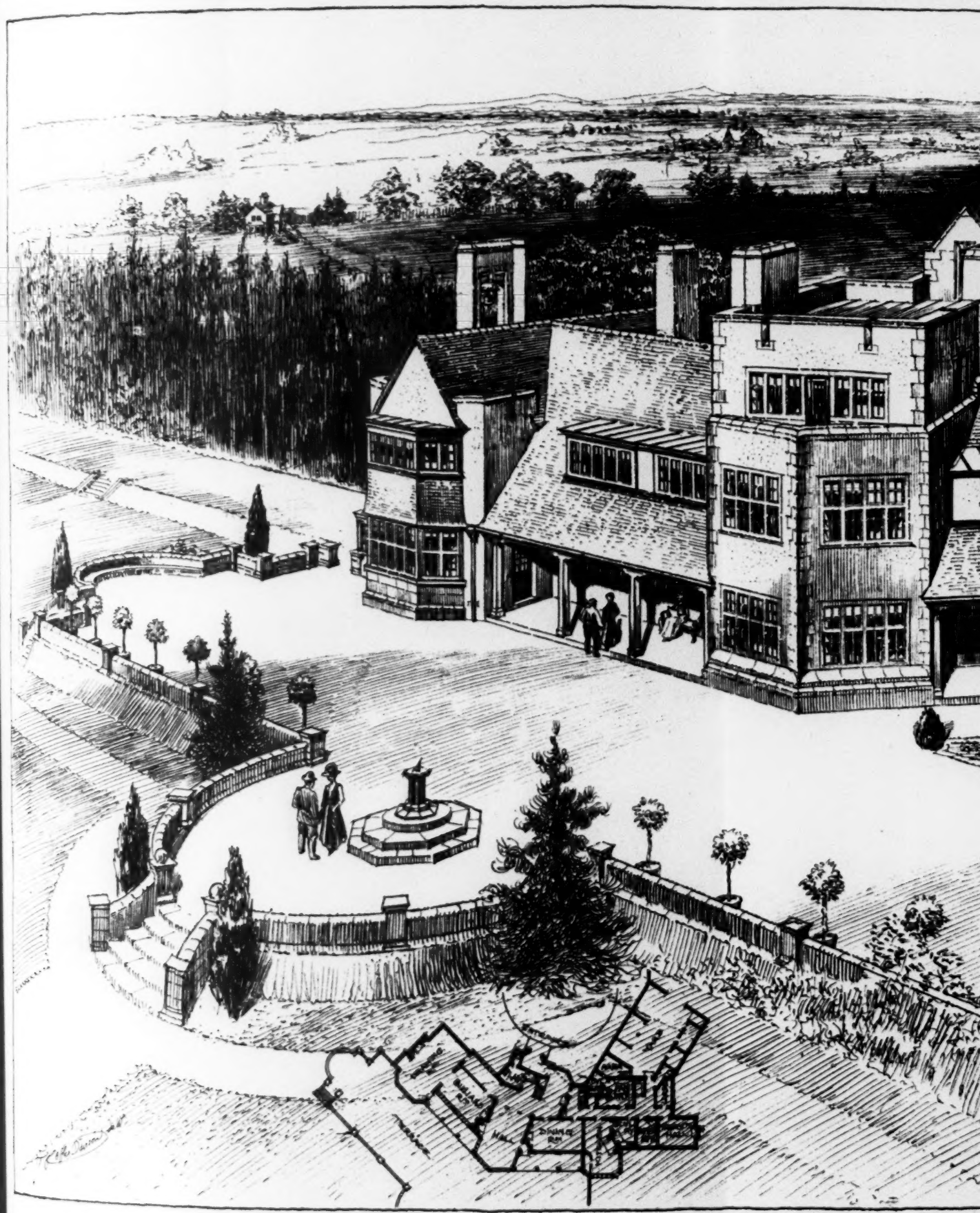




HOUSE NEAR DUBLIN.—Mr. W. D. Caröe.
VIEW FROM GARDEN.

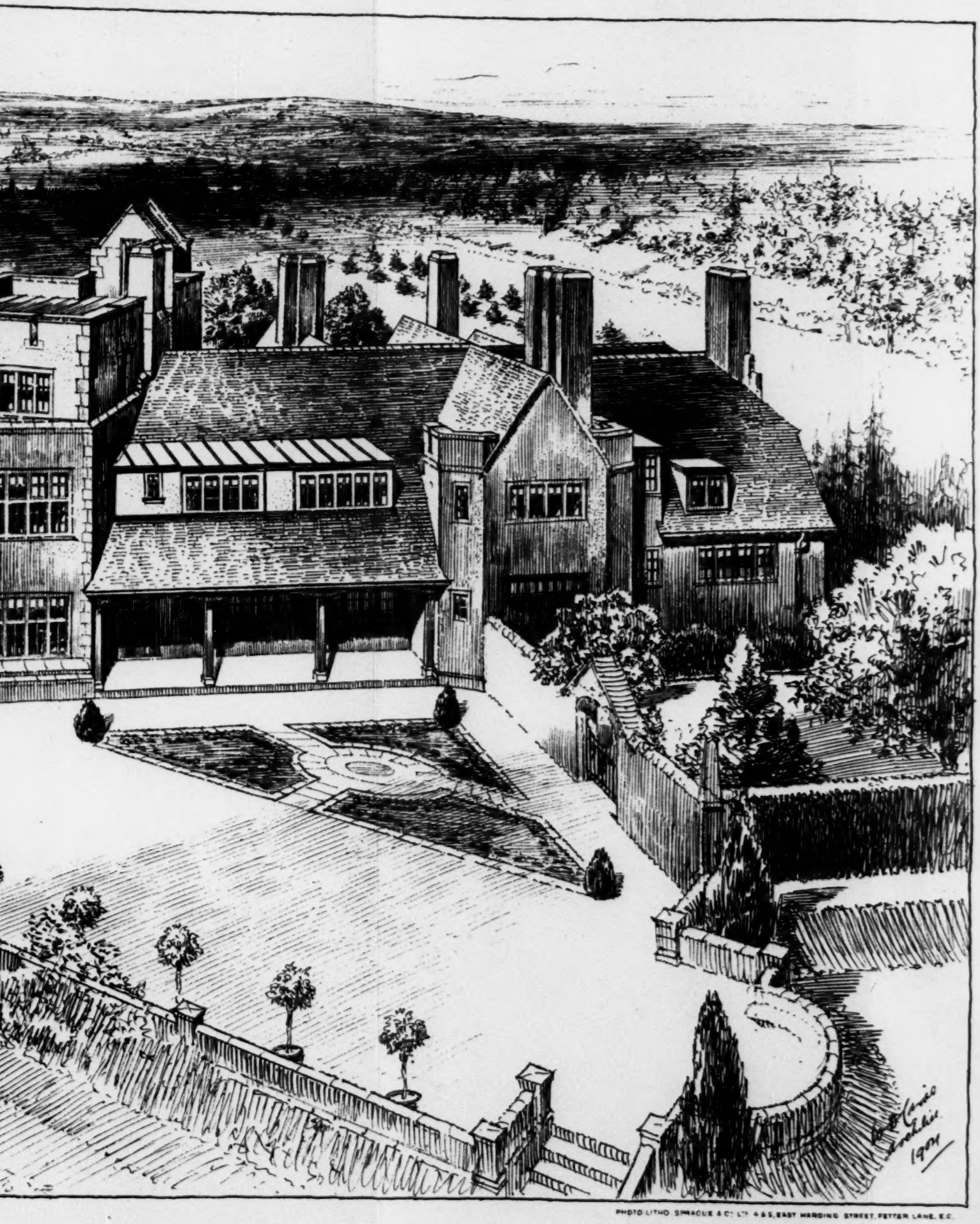
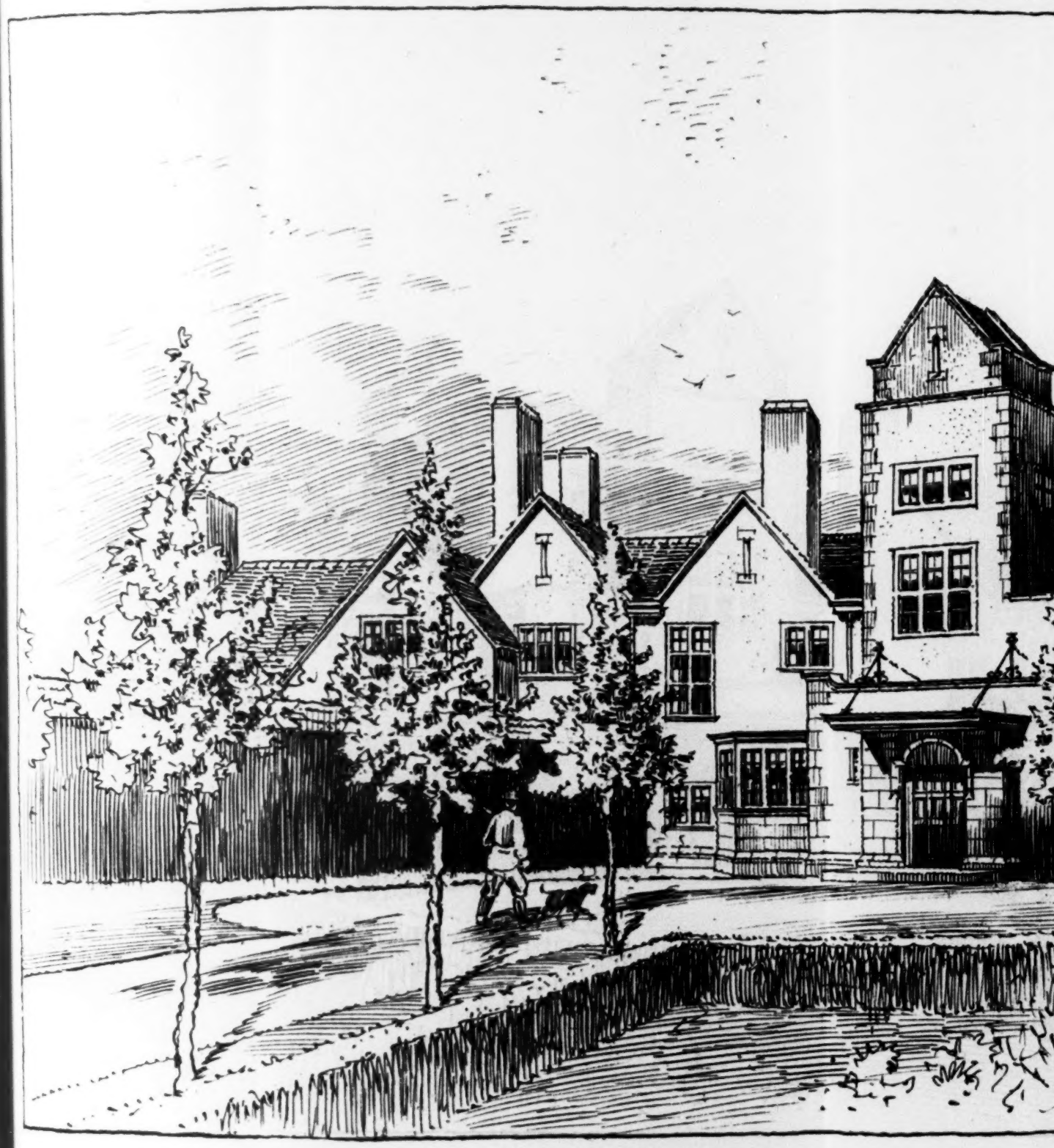


PHOTO LITHO SPRAGUE & Co LTD 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

—Mr. W. D. Caröe, F.R.I.B.A., Architect.

EW FROM GARDEN.



HOUSE NEAR DUBLIN.—Mr. W. I

VIEW OF ENTRAN

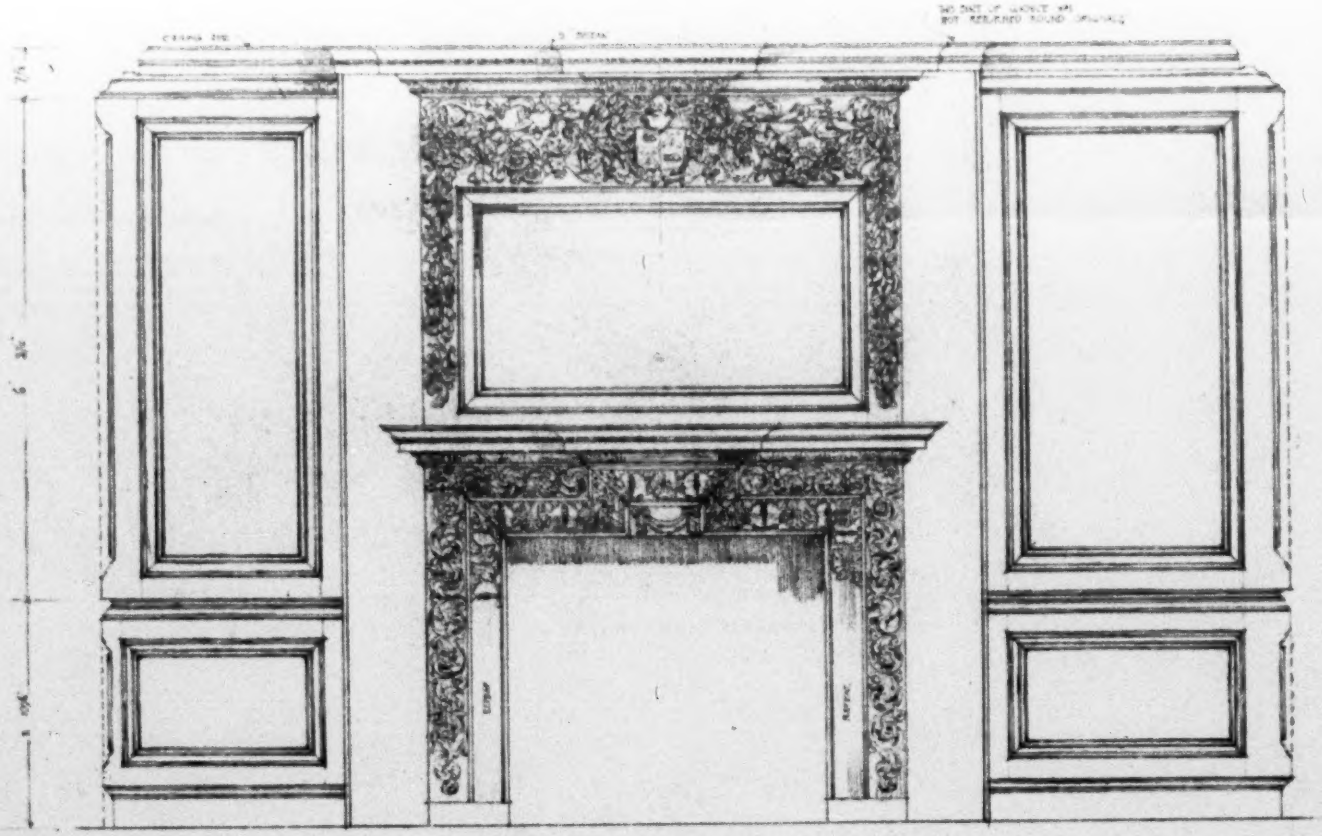
PHOTO LITHO. SPRAGUE & Co LTD 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

DUBLIN.—Mr. W. D. Caröe, F.R.I.B.A., Architect

VIEW OF ENTRANCE FRONT.

Nº3 CLIFFORD'S INN.

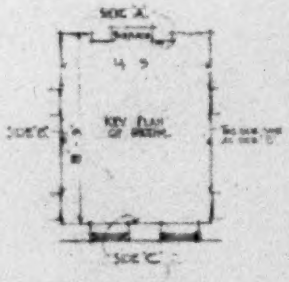
SCALE DRAWINGS OF PANELLED ROOM.



ELEVATION OF SIDE A (SEE KEY PLAN)

NOTE.

THE PANELLING IS IN OAK. A THE CARVED DECORATION IS PARTLY OF CEDER.
THE PANELLING WAS REMOVED FROM A ROOM AT Nº3 CLIFFORDS INN LONDON & ERECTED (WITH LITTLE DEVIATION FROM THE ORIGINAL ARRANGEMENT) IN SOUTH KENSINGTON MUSEUM
THE CHAMBER IN WHICH THE PANELLING WAS ERECTED WAS REBUILT BY JOHN FENHALLOW IN 1686 AND PROCCUPIED BY HIM FROM 1689 UNTIL HIS DEATH IN 1716
OVER THE FIREPLACE IS A SHIELD OF ARMS. FENHALLOW, QUARTERING FENWICK.



PLAN OF ROOM AS FITTED UP IN S. KENSINGTON MUSEUM.

SCALE

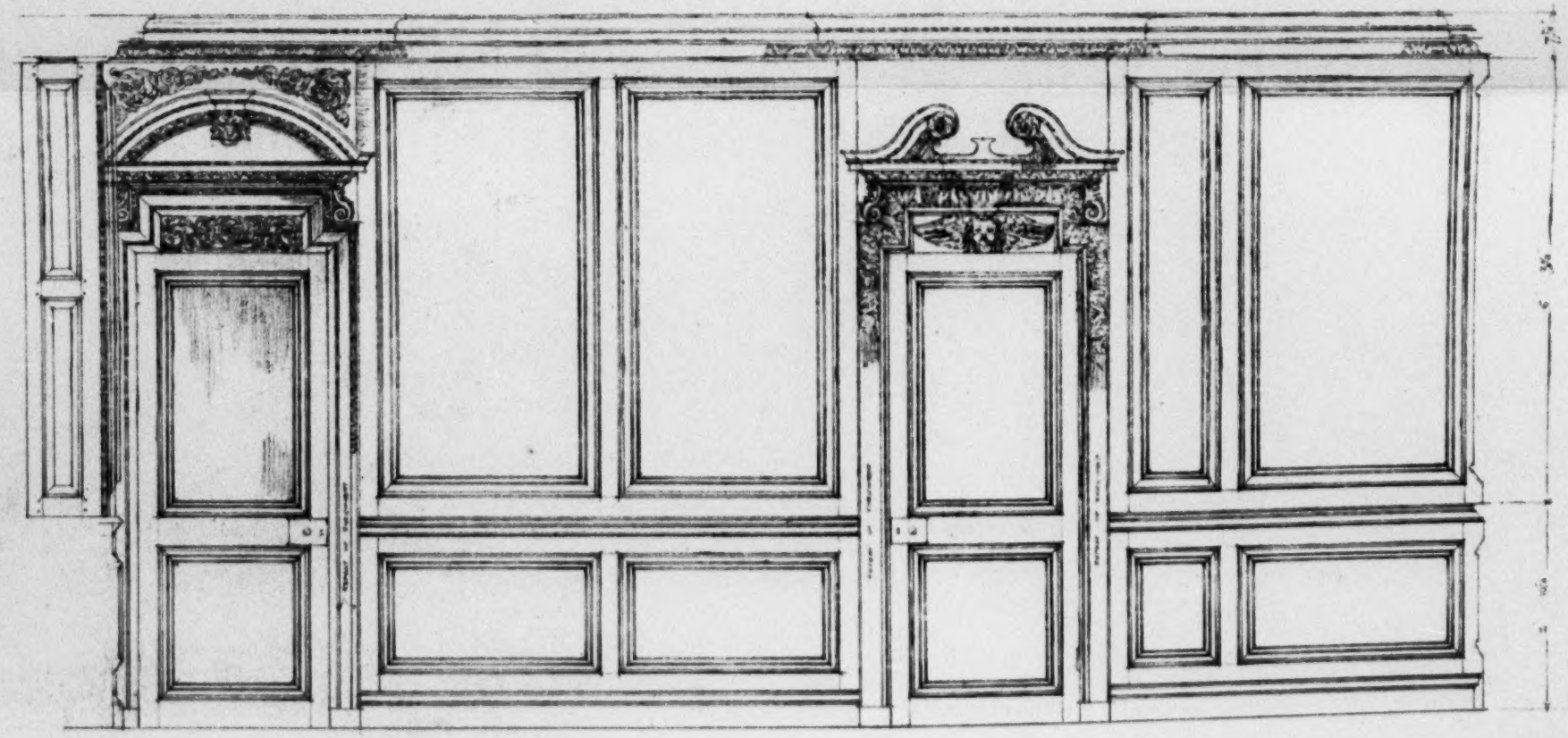
REDUCED AND DRAWN BY ANNE BADCOCK. APRIL 1905.

"INK-PHOTO" SPRAGUE & Cº LTD 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

N° 3 CLIFFORD'S INN.

Drawing N°2

SCALE DRAWINGS OF PANELLED ROOM.



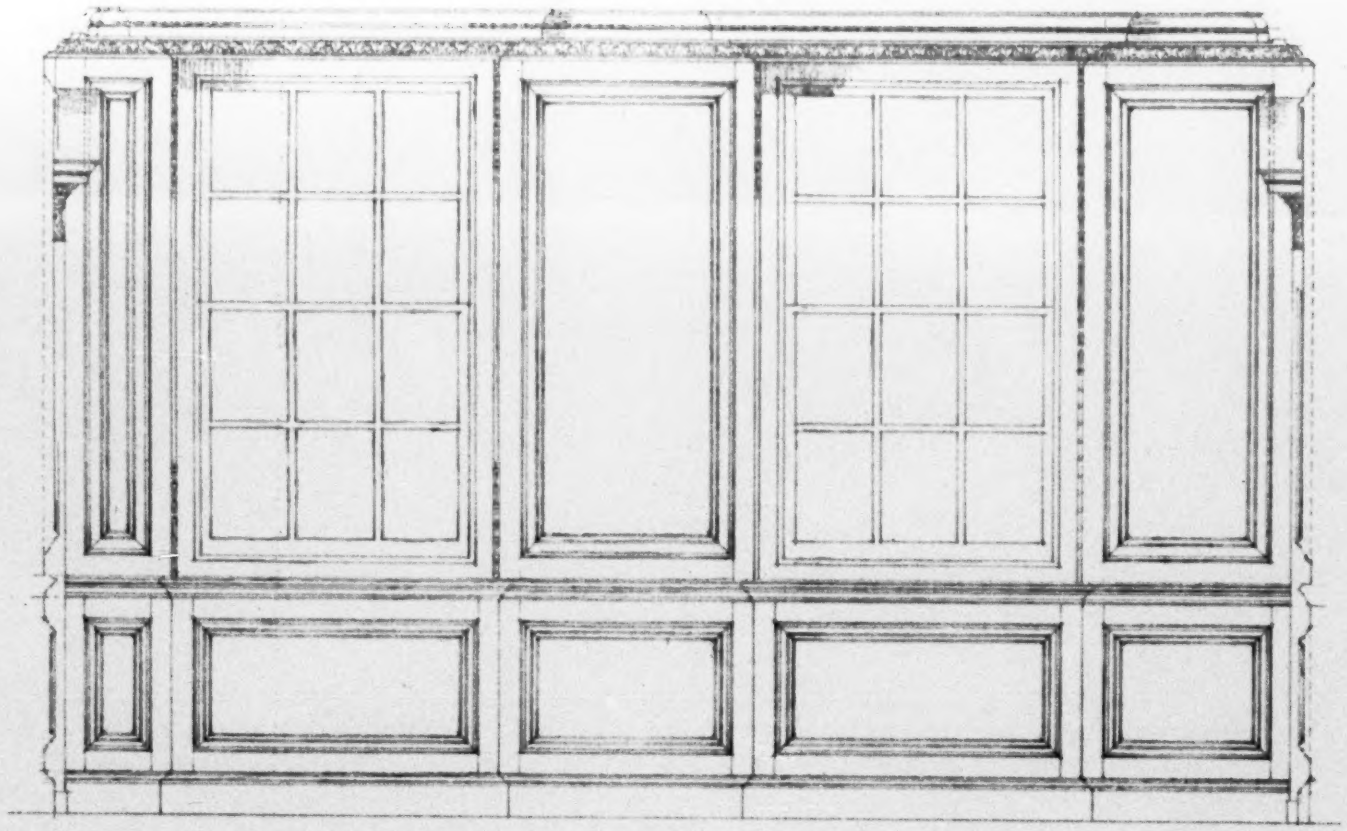
ELEVATION OF SIDE 'B' (KEY PLAN ON DRAWING N°1)

SCALE.

MEASURED AND DRAWN BY JOHN BARCLAY, ARCH. 1905.

INK PHOTO, SPRAGUE & Co LTD 4 & 5, EASY HARDING STREET, FETTER LANE, E.C.

SCALE DRAWINGS OF PANELLED ROOM



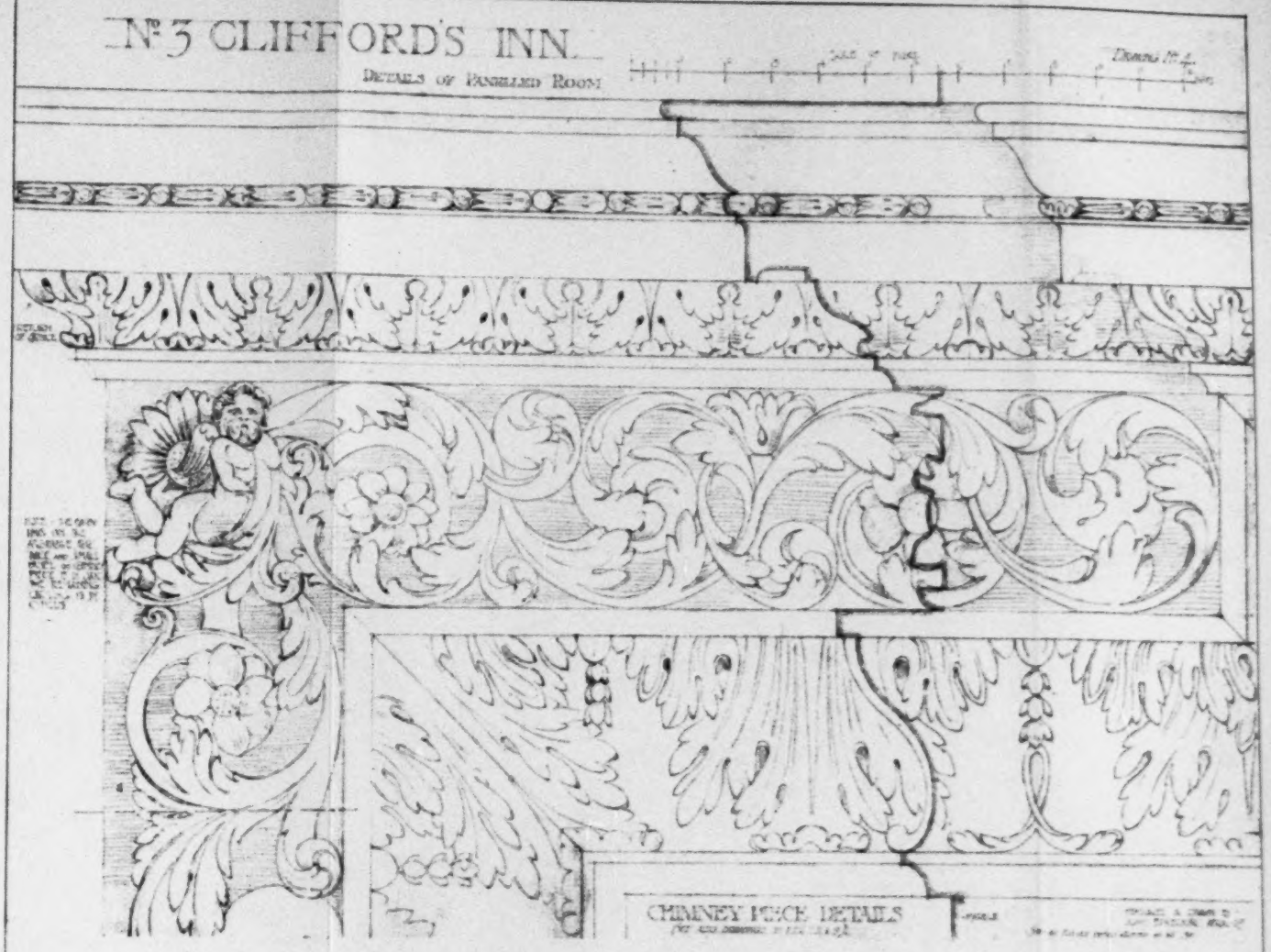
ELEVATION OF SIDE C. (KEY PLAN ON DRAWING N°1)

SCALE

MEASURED & DRAWN BY
JOHN BADDELEY APRIL 1905

Nº 3 CLIFFORD'S INN.

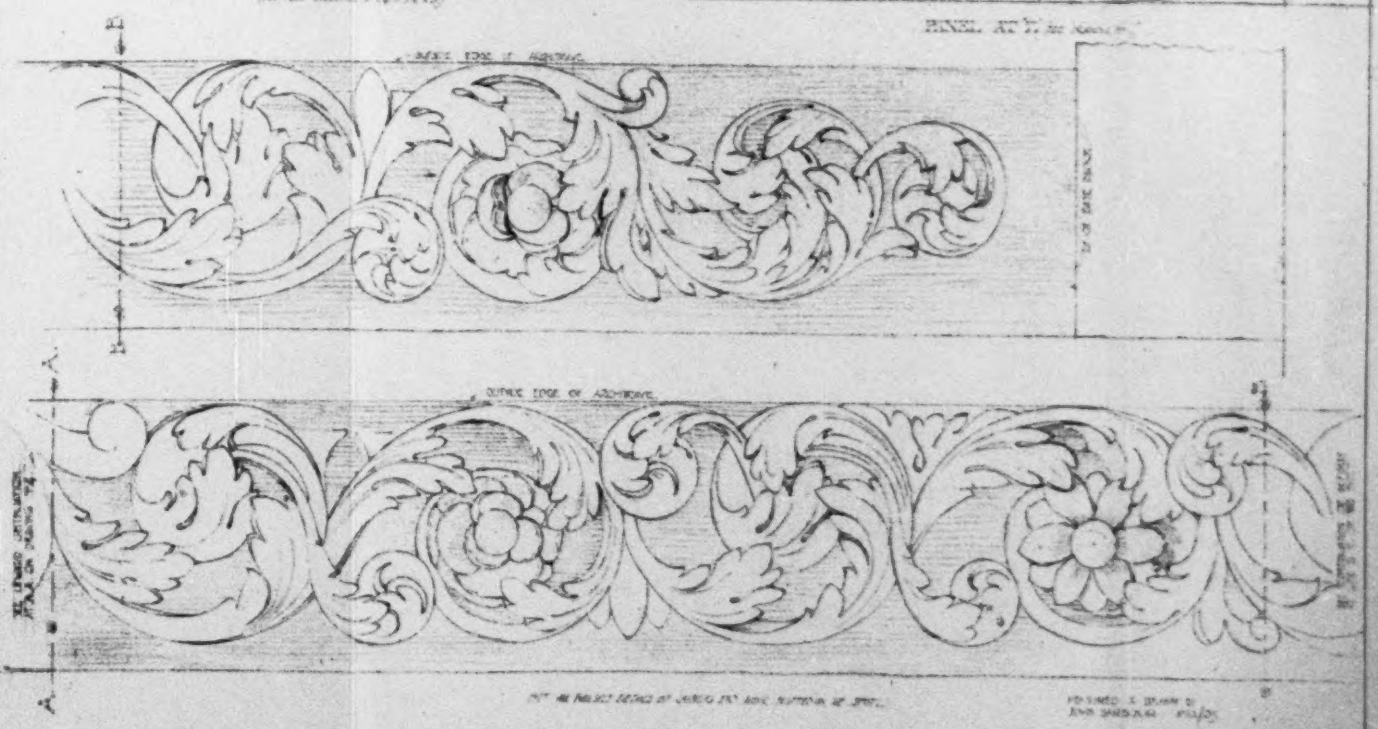
DETAILS OF PANELLED ROOM



Nº 3 CLIFFORD'S INN.

DETAILS OF PANELLED ROOM

CHIMNEY PIECE DETAILS



PANELLING AND DETAILS FROM HOUSE IN CLIFFORD'S INN.

THESE illustrations of woodwork formerly in the house which was No. 3, Clifford's Inn, are from a set of drawings made by Mr. John Barbour, which form a complete illustration of a very fine piece of XVIIth century interior decoration. The sheets showing the remainder of the details will be given in our next issue. The following is Mr. Barbour's comment on the work :—

"The room from which the panelling was originally taken was situated in the south-west corner of Clifford's Inn, and formerly known as No. 3. There is no record giving the exact date of the panelling, but it is assumed that it was erected when the chamber was rebuilt in 1686 by one John Penhallow, who, in recognition of the interest he had taken and the moneys he had spent in the rebuilding of his chamber, was allowed to reoccupy the chamber again in 1688 until his death in 1716. The panelling is in oak, and the carved decoration is partly in cedar. The carving is very much undercut in some parts, and it has been attributed to Gibbons or his pupils. The scrolls at reprise of architrave on the two doors (next windows) and the cupids' heads on the other two doors are very fine pieces of work. The carved natural foliage round the chimney-piece panel is also exceptionally good. Some months ago the panelling was erected in the South Kensington Museum, with little or no alteration from the original arrangement."

OLD HOUSE, EVESHAM CHURCH-YARD.

THIS sketch of a picturesque old house, beneath which is one of the entries to the churchyard at Evesham, is by Mr. Sydney R. Jones, of Birmingham, the author of the fine interior view of Mr. Bidlake's church of St. Agatha, Birmingham, which was published as one of the plates in our issue of August 12. We call attention to that, as we omitted to mention his name at the time.

THE ARCHITECTURAL ASSOCIATION WEEK-END VISIT TO CAMBRIDGE.

A PARTY of about twenty members of the Architectural Association met at King's Cross Station on Friday evening last week and left by the five o'clock train for Cambridge, to take part in the week-end visit to that town, and, after a rapid run, arrived at Cambridge in time for dinner at the head-quarters (the Bull Hotel).

Mr. W. M. Fawcett had kindly consented to show the party the various buildings of interest in the town, and had taken a great

Sketch in Evesham Church-yard. By Mr. Sydney R. Jones.

deal of trouble to get together information regarding them, as well as obtaining permission for the party to visit the buildings and the necessary permits to photograph and sketch.

On Saturday morning Mr. Fawcett met the party at Peterhouse College at 9.30. It had previously been arranged to commence with the Fitzwilliam Museum, but that part of the programme had to be omitted on account of the small amount of time at the disposal of the party. Peterhouse made an ideal starting-place, as it is situated at the end of Downing-street, and is the end one of a long line of colleges and halls, and is also the oldest foundation, having been begun in 1286 and continued into the XVth century. The library was built in 1590, the chapel in 1632, the windows in the latter being glazed with Munich glass. The frescoes in the dining-hall were by G. G. Scott, junr., in 1868, who also restored and repanelled the fellows' or combination room. The adjoining church (St. Mary-the-Less), formerly the college chapel, was next visited; it contains some good glass in the east window. Pembroke College was next visited, the chapel of which was built by Sir Christopher Wren in 1665, and lengthened by G. G. Scott, junr., in a most satisfactory manner, quite retaining all the original feeling. The dining-hall and combination-room, by Waterhouse, were also noticed.

At Queens' College the hall, decorated by Mr. Bodley, with the combination-room in its original position in the rear, were seen, as was also the quaint old cloister, the one on the north side having above it a large overhanging gallery made to connect the original quarters of the master with those added later on the other side of this courtyard.

Some new buildings designed by Mr. Fawcett were also visited, and after the new bridge of teak erected over the river last year to replace the old one had been duly inspected, the party proceeded to King's College, passing on the way both Corpus Christi and St. Catharine's, to which, however, time would not permit of any attention being paid. King's Chapel, no doubt the most beautiful college chapel in the country, was first visited, and here the party spent a considerable time inspecting the splendid choir-stalls and organ-case, also the whole series of pictures in stained glass, as well as the wonderful fan vaulting, and afterwards proceeded to the roof, which was re-covered with the original lead, re-cast and re-laid about four years ago, and from which a splendid view of the town and colleges may be obtained. The chapel was commenced in 1446, the stone-work completed in 1515, and the woodwork in 1536. The party noticed also the Fellows' building, erected in 1724, the hall and library by Wilkins, in 1824, and (more recent) the admirably-planned block of buildings by Mr. Bodley, passing through the much-abused and also much-admired screen to the new Sedgwick Geological Museum, by Mr. T. G. Jackson, pausing a moment to look at the church of St. Benedict's, with its Saxon tower, and also the new Medical School, by Mr. Prior, and the other modern buildings in Downing-street.

At the Sedgwick Museum the principal (Professor Hughes) conducted the members round the building; and after lunch both the University library, by Wright, and the Senate House, by Gibbs, were passed, and the first stop was made at Clare College, rebuilt in 1638. Here the chapel hall and library were visited, in the latter of which hangs a set of measured drawings of the college, submitted some years ago for the R.I.B.A. medal. Caius College, with the modern additions by Waterhouse, and that still more recently by Sir Aston Webb, were also inspected, and a move was then made for Trinity.

Passing through the gate into the great court, with its stone fountain in the centre, the chapel was visited; but the dining-hall was, unfortunately, closed, which, with its minstrels' gallery, splendidly carved, and its open roof and lantern, would have been worth seeing. Passing through the Neville Court and under Wren's library, which was also closed, the party crossed the river and entered St. John's, which extends on both sides of the river, being connected by the so-called Bridge of Sighs. The chapel, designed by Sir G. Scott (1863-9), and erected at a cost of 53,000*l*., was viewed with admiration; and retracing their steps along Trinity-street, a move was made for Jesus College, founded in 1495 by Alcock, Bishop of Ely, upon the site of a nunnery, and the beautiful Early English chapel (very well restored by Pugin), with the original woodwork in its former position, was the chief point of interest. In the waning light All Saints' Church, by Mr. Bodley (1864), was entered, and a hasty visit was paid to Sidney-Sussex, Christ's, and Emmanuel Colleges, where there was but little time to do more than take a hasty glance round at these most interesting buildings. A hearty vote of thanks was then recorded to Mr. Fawcett for his great kindness in conducting the members round and pointing out the various objects of interest.

On Sunday the members employed themselves in sketching or photographing the various portions of the interesting building seen the day previously, and in the afternoon, upon the kind invitation of Mr. Fawcett, a visit was paid to the Botanic Gardens, which came as a welcome change from Saturday's round of events.

An early train was caught to town on Monday morning, and a most enjoyable and thoroughly interesting visit thus terminated.

COMPETITION.

SCHOOL, REDDISH.—In the competition for a new school at Reddish, for the Stockport Education Committée, the assessor, Mr. J. W. Simpson, F.R.I.B.A., has awarded the premiums as follows:—1st, Messrs Cheers & Smith, Blackburn; 2nd, Messrs. Winder & Taylor, Oldham; 3rd, Messrs. Adshead & Holt, Manchester.

Books.

Pannell's Reference Guide for Home and Office. (London: The Granville Press. 1905. 6s. 6d.)

THIS thick volume contains really a wonderful amount of information in comparison with its cost. The heads of the contents include — (1) An English Dictionary; (2) Aids to the Study of English; (3) A Dictionary of General Information; (4) A Medical Dictionary; (5) A Guide to Education and the Professions; (6) A Social Guide; (7) The World and the Empire; (8) A Legal Guide; and (9) A Commercial Guide.

Of the merits of sections 4 and 8 we cannot of course profess to speak. The English Dictionary is naturally a very concise one, and as such was perhaps hardly worth inserting, as fuller dictionaries than this are numerous and cheap, and few people are without one; and while some words are omitted which we should have expected to find, some are inserted which one would not have expected: "Hôtel-Dieu," for instance, is hardly an English word. Section 2 includes a useful list of the derivation of English words, and lists of authors, characters in fiction, familiar quotations with their provenance, etc; also "common errors of speech" and their correction, most of which, however, can hardly be common except among very common people. "General Information" is a very full and useful section; its varied character may be inferred from quoting the heads in one column taken at random — "Pola," "Poland," "Polar Expeditions," "Polder," "Polecat," and "Pole Star"; and there is sufficient general information on each of these. "Social Guides" (Section 6) are generally rather amusing, and this is no exception; but the advice under some of the headings, *e.g.*, "Public Speaking" and "Duties of a Chairman" is really useful and full of sound sense. Section 7 contains a great deal of information on important subjects. Taken as a whole this is a reference book which may be of great service where immediate information is required.

Roofs and Floors of New Buildings: Their Structure and Stability. By ERNEST H. ESSEX, A.M.Inst.C.E. (London: The St. Bride's Press, Ltd.)

OWING to the variations existing in the requirements of the by-laws of urban authorities with respect to the construction of roofs and floors, a set of model by-laws was issued some time ago by the Local Government Board. Unfortunately, the basis of the calculations from which these regulations were prepared is by no means clear, and the object of the author in writing this book was to assist surveyors and others to arrive at a decision as to how far the model by-laws should be accepted, and to what extent they should be modified. Accordingly, tables have been prepared in which the proportions recommended by the Local Government Board and those computed by the author are presented for comparison. The basis of calculation adopted is the same as that suggested in the general rules of the model by-laws, but the results show that the proportions recommended in the by-laws for rafters, purlins, beams, and joists, are in some cases too slight, and in others unnecessarily heavy. Comparison of the tables shows further that the dimensions of trimmer joists set forth in the clauses of the by-laws are not based on any definite calculation, and the clauses are worded in such a manner as to render evasions easy. Mr. Essex points out that no attention is directed in the by-laws to the strength of iron and steel beams, an omission which is quite incomprehensible. The calculated tables, and an amended clause suggested for the dimensions of trimmer joists, ought to be of considerable value to municipal engineers and surveyors, and to local authorities generally.

Hydraulic Power Engineering. By G. CROYDON MARKS, A.M.Inst.C.E., M.I.Mech.E., F.C.I.P.A. Second Edition Enlarged. London: Crosby Lockwood & Son. 1905.

THIS is the second edition of a work which was published about five years ago, and the present volume has been somewhat enlarged so as to permit the inclusion of descriptions and illustrations of recent developments in hydraulic pressing and lifting machinery, as well as illustrations of typical valves. The treatise covers the subject of hydraulic engineering in an excellent manner, although for information on some special branches of applied hydraulics the reader may have to refer to other treatises where fuller details are given. The author has performed his task in a most able manner, and his book is one that can be recommended to all desiring reliable information relative to hydraulic power machinery.

Engineers' Turning in Principle and Practice. By JOSEPH HORNER, A.M.I.Mech.E. London: Crosby Lockwood & Son. 1905.

IN taking up the discussion of a subject about which a good deal has been written in a general way, the author has devoted himself to the production of a manual more particularly intended to meet the requirements of working engineers and technical students. The operations that can be performed in a lathe include the machining of plane and cylindrical surfaces, the latter both internally and externally. In the workshop of the amateur, and in many places where repair or jobbing work predominates, the lathe is employed as a kind of universal tool. This is by no means the case in a large engineering establishment, where lathes are rarely used for work other than turning, facing, boring, and screw-cutting, and, further, a large proportion of such work is performed in special machine tools. Ordinary lathe work comprises that done between centres, face and chuck work, and screw-cutting. Each of these classes is dealt with very fully by Mr. Horner; the various tools, chucks, and other adjuncts of the lathe are fully described and illustrated; and screw-cutting, which necessitates greater practical experience than operations performed in the lathe, as well as a certain amount of mathematical knowledge, is treated in a thoroughly practical manner. A considerable amount of useful information is to be found in the last chapter on the subject of high-speed steels. The volume is admirably illustrated, and should be widely appreciated by those to whom it is especially addressed.

Locks and Builders' Hardware: A Handbook for Architects. By HENRY R. TOWNE. (New York: John Wiley & Sons; London: Chapman & Hall. 1904.)

MR. TOWNE is the President of the Yale and Towne Manufacturing Company, and the

book before us bears evidence of the fact of his association with that company, but it is only fair to say that the book, although it has some of the marks of a trade catalogue, is in reality a treatise which contains a good deal of valuable and interesting information, both practical and historical. It includes articles by various authors on different subjects, the most important being a series on "The Schools of Ornament," by W. W. Kent, architect; this occupies nearly 400 pages, and contains hundreds of examples of ornament in stone, wood, and metal. The practical part of the book illustrates in detail the construction of locks of different kinds, and describes the various fittings required for windows, doors, partitions, etc. Among the "miscellaneous information" we note details of French and German casement windows, the weight of glazed sashes, and hints on the polishing of hardwood floors. The book contains about 1,200 pages, and is profusely illustrated, and well bound.

Correspondence.

A PROPOSAL FOR HOLIDAYS IN THE BUILDING TRADES.

SIR,—Will you permit us, through the medium of your paper, to ventilate a subject which, whilst of special importance to two or three large trades, is also of public interest.

It has been suggested that an Association be formed for promoting an annual holiday "close time" applied to the building, painting, plumbing, and allied trades. There are many difficulties in the way of success to such a scheme, and it would be the business of an Association to overcome them, but it would be useless even to form an Association unless the trades interested were very generally in favour of the movement, and we shall be pleased if any of your readers will communicate to us their views on the subject.

The suggestions which have already been made as to time vary from five to fourteen days (although each includes August Bank Holiday).

Those who advocate the fourteen days maintain that at Christmas, Whitsuntide, and Easter the Bank holidays alone should be taken, and that by this course there would be a saving at those times of five to seven days, and already there is a loss in August Bank Holiday week of two to three days—seven to ten days—so that a fortnight might not entail much extra loss.

Whatever the difficulties in the way of such a scheme, the disadvantages of the present system of holidays are obvious.

A holiday loses half its value if, at its close, a colleague's work has to be taken over in addition to one's own.

In an office where there is a large staff disorganisation is spread over a period of some months in every year.

Many a man in these trades (especially a man without a partner) feels that he cannot leave his business for several consecutive days under present conditions.

However, we hope you will help us to obtain some information as to the general opinion on this very important question.—

S. BOULTON,
Director, John Hall & Sons (Bristol and London), Ltd.

*** The subject is a very important one, and we shall be glad to hear other opinions on the proposal.—ED.

CONCRETE PUGGING FOR FLOORS.

SIR,—In your issue of June 17, just to hand, I notice a letter by Messrs. Holman & Goodsham on the above subject. Having recently seen the result of concrete pugging on the floor joists of a warehouse in this city, I send you a sketch and a few particulars thereof, which, though they will be late in arriving, may be of service.

The floor in question is covered with Seyssel asphalt, the concrete is cement concrete (our lime is useless for that purpose), the timber is Oregon. Signs of failure showed themselves on the top surface of the asphalt by depressions along the lines of joists and in one or two places underneath by the fillets and boarding giving way. On opening up the floor I found all the joists enclosed within the concrete more or less attacked by dry rot. It was worst at the ends, where joists butted against one another over girders and reached down to the fillet. Along the top edges of the joists it averaged 1½ in. or 2 in. deep. The most severely damaged joists were renewed, and I have advised my clients that the present floor will not last more than four or five years, and during that time must not be loaded beyond a specified maximum.

The building was erected within the last twenty years, but I have been unable to ascertain whether the concrete was original or a subsequent alteration. Generally it is a soundly-built structure with the above exception, which I consider a grave error. JOHN SULMAN.

Sydney, August 1.

ROCHESTER TECHNICAL INSTITUTE COMPETITION.

SIR,—In your interesting review of the 131 sets of designs submitted in the competition for the proposed Technical Institute at Rochester, you condemn several designs in which the rooms are shown smaller than, apparently, in the successful competitor's plans.

Several competitors, after reading the instructions, saw at once that it would be impossible to carry out the building with the rooms the sizes originally required within the limit of cost; therefore the question was asked of the promoters whether the rooms could be reduced in size, and the reply was that they could. Hence it was no doubt that several of the competitors indicated smaller rooms in designs that were made with the honest intention of endeavouring to keep within the limit of cost.

This point the professional assessor appears to have ignored, for it was only by means of taking advantage of the levels and compressing the building generally that it would be possible to carry it out for 8,000*l*. It will be interesting to see the result of the contractors' estimates for the accepted design. A COMPETITOR.

TRADE CATALOGUES.

THE Simplex Steel Conduit Company send us a Price Sheet, giving in a condensed form most of the prices in their 1905 Catalogue. It contains a series of small diagrams of the various portions of their conduit system, with prices of the different sizes opposite, and is intended as a sheet which can be hung in the office or put in the pocket.

Messrs. Fenlon & Son have sent us two leaflets showing their "Tudor" and "Fleet" geysers. The former is an automatic geyser, working under a pressure of water, and so arranged that the opening of any tap connected to the geyser turns up the gas and allows the water to be heated in passing through the geyser. The "Fleet" is of the open-chamber type, the water passing through it being in contact with the fumes from the burning gas.

We have received from Messrs. Twyfords (Hanley) a small catalogue containing illustrations of their "Centaur" siphon water-closet basin. No section of the basin is given in the catalogue, although to the architect a drawing of this kind is much more important than a general view. The basin is made with the outlet either in the back or the bottom, the latter being contrary to the London County Council regulations. A section of the basin with back outlet has been kindly sent us by Messrs. Twyfords in answer to our request, and we note that the pan itself is like an ordinary wash-down basin reversed, that is to say, with the outlet of the trap towards the front of the pedestal; there is a lip at the outlet of the trap, so that the water has a clear drop into a nearly vertical tube (formed in the pottery) which connects at right angles with a horizontal tube (also formed in the pottery) running under the trap to the back of the basin. By means of a weir near the final outlet, a certain amount of water is retained in the horizontal tube. We have not seen the basin in operation, but the catalogue states that it will work satisfactorily with a 2-gallon flush.

Messrs. English Brothers (Wisbech) have sent us an interesting little catalogue of their timber buildings and sheds, gates, fencing, etc. The illustrations are well done, many of them being reproduced from photographs, and the designs are simple and appropriate. Among the illustrations are two showing the firm's creosoting tank. The specifications give the scantlings of the timbers, which is certainly a point in favour of the firm.

A pamphlet entitled "Some Simple Facts About Rock Asphalte" (*sic*) has been sent us by the French Asphalte Company. It contains a good deal of interesting information about asphalt and its uses in buildings, and for roads and footways, and describes the methods of laying the material for different purposes. The specifications on pages 15 and 16 will be useful to architects and surveyors.

Messrs. John Knight & Sons have issued a new catalogue entitled "Non-Detachable Fastenings for Inspection Covers, etc." The non-detachable fastenings are of gun-metal, and are applied to inspection covers for manholes, gullies, pipes, and traps. A special feature of the catalogue is the series of illustrations of closed cast-iron inspection pipes and traps for the bottoms of manholes. Sealed waste-gullies grouped in brick chambers are also shown, with side inlets for ventilation above the standing water. All the gullies, traps, and inspection chambers are of cast-iron.

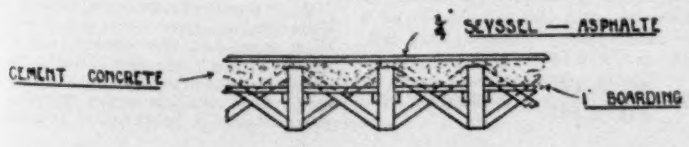
Messrs. Abbott & Co. (Lancaster) have sent us a well-produced catalogue containing thirty full-page plates (some in colours) illustrating their stained-glass windows, leaded lights, brasses, metal casements, and fittings, lead rain-water heads and pipes, etc. Some of the designs are of good character.

Messrs. Falk, Stadelmann, & Co., Ltd., have sent us their catalogue of acetylene fittings and accessories. This is the most comprehensive list of acetylene appliances which has yet come under our notice, and includes illustrations of a great variety of pendants, brackets, standards, and glass shades. A notable feature of the catalogue is the number of forms of acetylene burner shown, almost every conceivable form for either lighting or heating being included. Their "Frankolin" purifier for acetylene is too well known to call for special description. Acetylene table lamps, carriage lamps, hand lamps, and street lamps are also figured.

Messrs. Robert W. Blackwell & Co. send us a booklet containing particulars of the "Flexite" metal preservative paints made by the Standard Paint Co., of New York. These paints are produced in four shades—black, red, olive, and green—the pigment in each having been selected as the most inert material obtainable to represent the desired colour. The vehicle consists of pure linseed oil, blended with a refractory substance, the nature of which is not revealed. A most important condition in connexion with paints for this purpose is that the pigment shall be incapable of further combination with oxygen, for chemical action of the kind speedily changes the character of the medium, and renders the paint pulverulent and brittle. This condition appears to be complied with in the case of the flexite paints, which should be found a durable and satisfactory material for protecting metal surfaces.

Messrs. Wallach Brothers send us their 1905 Novelty List, which contains particulars and prices of some very handy tools and appliances. Among them we select the following for special notice:—Portable electric drills, limewashing machines, gasoline forges of various patterns, torch lights, blast heaters, and sand-blast machines. This catalogue is of direct interest to building and engineering contractors.

Messrs. W. H. Smith & Son send us three illustrated catalogues, or rather illustrative specimens of their work in three branches—half-tone printing; types used by them; and decorative headings for commercial stationery. One of the half-tone prints from photographs, the first, is a little spotty; the reproduction of a photograph, a wood in winter, is as good as it could be; and the colour prints included are also good. For the other two portfolios we have nothing but praise. The examples of type and printing are excellent both in the style of lettering and in clearness of impression; and the headings for commercial paper are artistic and refined in design. When one considers what artistic monstrosities one constantly sees in these kind of headings, which represent too often



what can only be called "writing-master's art," we may wish that more firms would avail themselves of Messrs. W. H. Smith's capacity for putting artistic spirit into this class of work.

The Student's Column.

STEAM BOILERS AND PIPES.—XII.

CHIMNEYS.

NO part of a boiler installation is more important than the chimney, which furnishes the motive power serving to draw through the furnace the air necessary for combustion, and to carry away the gaseous products. As a general rule these products have to be discharged at such a height that they shall not constitute a source of annoyance to the occupants of surrounding premises. Hence the height of the chimney is very often governed by the regulations of local authorities, rather than by the mechanical principles which are discussed in the present and succeeding articles.

Head, or Draught Power.—The movement of air through a chimney, or a furnace, may be produced by any of the means enumerated below, separately or in combination :—

(1) *Natural draught*, due to the unbalanced pressure of a column of cold external air against a lighter column of heated gases inside a chimney.

(2) *Forced draught*, from a steam-blower or a fan.

(3) *Induced draught*, from a fan placed between the boiler and the chimney.

In the following notes we shall consider only natural draught, due to the difference of weight of two columns of air or gas, the unbalanced pressure being the motive power that forces the heated gases up the chimney.

As draught power is not affected by the area of the chimney, the area of the two columns can be taken at the unit measurement of 1 sq. ft.

Therefore, for a chimney of any given height, we have on one hand a column x ft. high by 1 sq. ft. area, consisting of heated gases in the chimney, and on the other hand a column of equal dimensions consisting of external air, the temperature of which is usually taken at the average of 62 deg. F.

The *head*, corresponding with the unbalanced pressure, can be expressed in feet of cold air, in pounds per square foot or per square inch, in ounces per square inch, or in inches of water.

Of these modes of expression the first and last are usually employed for the purposes of calculation, but in daily practice the inch of water is almost invariably taken as the unit of measurement.

Formula (1), p. 280, shows that the volume of air bears a direct proportion to the absolute temperature of 461 deg. below zero F.

Consequently the weight of air per cubic foot is inversely proportional to the volume, and bears an inverse proportion to the absolute temperature.

Hence

$$d = D\frac{(461 + T)}{(461 + t)} \quad \ldots\ldots (6)$$

where D = the weight per cubic foot of air at the temperature T; and d = the weight per cubic foot of air at the temperature t.

At 62 deg. F. the weight of dry air per cubic foot is 0·0761 lb., and this is a convenient basis for calculations, because 62 deg. is the standard to which chimney temperatures are usually referred.

Using the temperature of 62 deg. F. as a constant, formula (6) reduces to

$$d = \frac{0{\cdot}0761 \times (461 + 62)}{(461 + t)}$$

$$= 39{\cdot}8 \div (461 + t) \ldots (6a)$$

For ordinary practice the equation may be further simplified by using the factor 40 in place of 39·8.

Thus

$$d = 40 \div (461 + t) \quad \ldots\ldots (6b)$$

The rule then gives results that are a little too high, but this does not matter, as the error is on the safe side. Moreover, it must be remembered that the temperature prevailing in a chimney varies from day to day, and even from hour to hour, and that in the case of a new chimney it is impossible to make more than a rough estimate of the temperature that will be maintained. Therefore the weights computed by formula (6*b*) are sufficiently accurate for all practical purposes.

TABLE XVIII.—VOLUME AND WEIGHT OF DRY AIR AT DIFFERENT TEMPERATURES UNDER THE ATMOSPHERIC PRESSURE OF 29·92 IN. OF MERCURY, THE VOLUME AT 32 DEG. F. BEING 1·000.

Temp.	Volume.	Weight of a Cubic Foot.	Temp.	Volume.	Weight of a Cubic Foot.
deg. F.		lb.	deg. F.		lb.
32	1·0000	0·08073	525	2·0000	0·04036
42	1·0201	0·07914	550	2·0504	0·03936
52	1·0405	0·07758	575	2·1012	0·03841
62	1·0608	0·07610	600	2·1519	0·03751
72	1·0810	0·07467	625	2·1923	0·03665
82	1·1013	0·07330	650	2·2530	0·03582
92	1·1212	0·07197	675	2·3040	0·03503
102	1·1418	0·07069	700	2·3554	0·03428
112	1·1621	0·06946	725	2·4060	0·03355
122	1·1824	0·06827	750	2·4567	0·03286
132	1·2027	0·06712	775	2·5075	0·03220
142	1·2230	0·06600	800	2·5580	0·04156
152	1·2432	0·06492	850	2·6600	0·03035
162	1·2635	0·06388	900	2·7610	0·2924
172	1·2839	0·06287	950	2·8625	0·02821
182	1·3040	0·06190	1,000	2·9640	0·02724
192	1·3244	0·06095	1,100	3·1670	0·02549
202	1·3445	0·06003	1,200	3·3696	0·02396
212	1·3650	0·05913	1,300	3·5730	0·02260
222	1·3850	0·05827	1,400	3·7755	0·02138
232	1·4055	0·05743	1,500	3·9890	0·2029
242	1·4258	0·05662	1,600	4·1920	0·01931
252	1·4460	0·05581	1,700	4·3960	0·01841
262	1·4663	0·05505	1,800	4·5993	0·01760
272	1·4865	0·05430	1,900	4·8030	0·01685
282	1·5070	0·05356	2,000	5·0060	0·01617
292	1·5272	0·05285	2,100	5·2080	0·01554
300	1·5434	0·05230	2,200	5·4125	0·01495
325	1·5942	0·05063	2,300	5·6160	0·01441
350	1·6450	0·04907	2,400	5·8200	0·01391
375	1·6955	0·04761	2,500	6·0230	0·01344
400	1·7463	0·04622	2,600	6·2260	0·01300
425	1·7970	0·04492	2,700	6·4300	0·01259
450	1·8475	0·04369	2,800	6·6330	0·01223
475	1·8985	0·04252	2,900	6·8365	0·01184
500	1·9490	0·04141	3,000	7·0400	0·01150

Table XVIII. contains the volume and weight of air at different temperatures calculated in accordance with formulæ (1) and (6).

Although these formulæ do not apply with strict accuracy to air containing water vapour and other gases, nor to gases such as the products of combustion, the volumes and weights thereby obtained can be taken, without causing material error, to represent those of chimney gases.

Expressed in feet of cold air, the head (h) for a chimney of the height (H) is

$$h = H\left(\frac{D - d}{D}\right) \quad \ldots\ldots (7)$$

where D = weight per cubic foot of cold air and d = weight per cubic foot of hot gases in the chimney.

Expressed in pounds per square foot, the head for a similar chimney is

$$h_1 = H\ (D - d) \quad \ldots\ldots (8)$$

Expressed in inches of water, the head for a similar chimney, by a modification of formula (7), is

$$h_2 = H\left(\frac{D - d}{D}\right) 0{\cdot}01466 \quad \ldots (9)$$

or by a modification of formula (8)

$$h_2 = H\ (D - d)\ 0{\cdot}1926 \quad \ldots\ldots (10)$$

The factor for converting the head from feet of air to inches of water is [0·0761 (12 ÷ 62·3)] in one case, and (12 ÷ 62·3) in the other.

The height of the chimney in feet (H) must always be measured from the level of the boiler fire-grate to the top of the chimney.

In the following example we have adopted such temperatures for the external air and internal gases that $\left(\frac{D - d}{D}\right) = 0{\cdot}5$. This proportion is approximately observed in general practice, except where economiser plant is employed, and, with the object of simplifying calculations, we have employed the same ratio in subsequent examples, wherever suitable.

Example (3).—Required the head for a chimney 100 ft. high, in which the temperature of the gases is 585 deg. F., the temperature of the external air being 62 deg. F.

The weight (D) of a cubic foot of air at 62 deg. = 0·0761 lb., and the weight (d) of a cubic foot of the chimney gases at 585 deg. by formula (6) is

$$d = 0{\cdot}0761\ \frac{461 + 62}{461 + 585} = 0{\cdot}03805 \text{ lb.}$$

Then by formula (9) the head, or draught power, of the chimney in inches of water is

$$h_2 = 100\left(\frac{0{\cdot}0761 - 0{\cdot}03805}{0{\cdot}03805}\right) 0{\cdot}01466$$

$$= 100 \times 0{\cdot}5 \times 0{\cdot}01466 = 0{\cdot}733 \text{ in.}$$

A similar result can be obtained by formula (10).

Thus

$$h_2 = 100\ (0{\cdot}0761 - 0{\cdot}03805)\ 0{\cdot}1926$$

$$= 0{\cdot}73284 \text{ in., practically } 0{\cdot}733 \text{ in.}$$

By inversions of formulæ (9) and (10) we can calculate the height of a chimney required to give a head equal to any required water measurement, for any specified external and internal temperatures.

Thus

$$H = \frac{h_2}{\left(\frac{D - d}{D}\right) 0{\cdot}01466} \quad \ldots\ldots (11)$$

or

$$H = \frac{h_2}{(D - d)\ 0{\cdot}1926} \quad \ldots\ldots (12)$$

Example (4).—Required the height of a chimney to give the head of 0·5 in. of water, the temperatures of the outer air and of the chimney gases being 62 deg. and 585 deg. respectively, as before.

Substituting the values of D and d, already found, in formula (11), we have

$$H = \frac{0{\cdot}5}{0{\cdot}5 \times 0{\cdot}01466} = 68{\cdot}2 \text{ ft.}$$

Using formula (12) we get the same result :—

$$H = \frac{0{\cdot}5}{(0{\cdot}0761 - 0{\cdot}03805) \times 0{\cdot}1926} = 68{\cdot}2 \text{ ft.}$$

Example (5).—Required the height of a chimney to give the head of 0·5 in. of water, as in example (4), but with the temperatures of the outer air and of the chimney gases at 62 deg. and 350 deg. respectively.

By Table XVIII., the corresponding densities are 0·0761 and 0·04907—say, 0·0491.

Then by formula (12) we obtain

$$H = \frac{0{\cdot}5}{(0{\cdot}0761 - 0{\cdot}0491)\ 0{\cdot}1926} = 96{\cdot}1 \text{ ft.}$$

According to the well-known theory of Morin, the best draught is secured when the absolute temperatures of the hot gases in the chimney and of the external air are in the ratio of 2·1 : 1—that is, when the density of the heated gases is rather less than half that of the external air. Hence the opinion is very generally expressed that the efficiency of a chimney is greatest when the volume of the fuel gases is about double that of the external air.

The theory which establishes this temperature limit is open to question so far as concerns efficiency, and it certainly cannot apply to draught power, because the head increases proportionately to the increase of the temperature of the chimney gases. Practical experience, however, proves that no advantage is to be gained by increasing the temperature of the chimney gases beyond 600 deg., the reasons being that the velocity does not increase so rapidly as the head, and that the theoretical increase is largely discounted by increased friction.

METROPOLITAN ASYLUMS BOARD.

THE managers of the Metropolitan Asylums district met at the offices of the Board, Victoria Embankment, on Saturday last.

Joyce Green Hospital.—On the recommendation of the Hospitals Committee the action of that Committee in providing a water supply for three cottages at this hospital was approved. The cost, as estimated by the engineer-in-chief, was 130*l*.

North-Western Hospital.—On the recommendation of the same Committee it was agreed to provide a vitreous enamelled cast-iron bath in the bathroom of each of the four "valley" wards of this hospital, and also to fix radiators in the bathrooms of each of the ten temporary wards, with a supply of steam for heating purposes. The total cost is estimated at 220*l*., and the matter was referred to the Works Committee.

ST. MAWGAN, ST. COLUMB, CORNWALL.—A three light stained-glass memorial window has just been erected in this church. It consists of the figures of the Virgin and Child in the centre light, with St. Anne and St. Joseph in the lights on each side. The window was executed by Messrs. Percy Bacon & Brothers, of London.

GENERAL BUILDING NEWS.

BAPTIST CHURCH, TWICKENHAM.—The foundation-stones of the Avenue Baptist Church at Twickenham were recently laid. The new building comprises a nave with side bays, chancel, and porches, with entrance from the St. Margaret's-road and Turk's-road frontages. The dimensions are:—Length, 62 ft., exclusive of porches, but including chancel; breadth, 35 ft.; height to ridge of roof, 37 ft. The church will have seating accommodation for 350. The complete scheme includes the erection of a tower about 50 ft. in height at the south-east angle of the nave, and the erection of a gallery to give fifty additional sittings. The building is faced externally with bright orange red Bracknell bricks from Messrs. Lawrence's yard, and with Monk's Park stone dressings. The steep pitched roof will be boarded and covered with Broseley tiles. Internally the walls are plastered, and relieved with stone and red brick arches to the windows and door openings, and red brick moulded corbel courses under wall plate at roof level, moulded stone corbels and columns carrying roof trusses. The walls will be lined to a height of 5 ft. with wood panelling. The flooring will be wood blocks, and have a fall towards the chancel. The entrance porches are paved with marble mosaic. The roof is of open timber construction and covered with diagonal boarding. All the internal wood work is to be slightly stained and varnished. The baptistry will be lined with marble mosaic and have marble steps at ends. The church is being erected by Messrs. S. N. Soole & Son, of Richmond, from designs prepared by Mr. Frank J. Brewer, architect. The cost of the work, excluding the tower and gallery, will be about 2,500*l*.

CHURCH RESTORATION, SALINE, N.B.—Mr. P. L. Henderson, architect, of Edinburgh, has prepared a scheme for the restoration of Saline Church. The estimated cost of the work is 550*l*.

CHURCH BUILDINGS, HAMPSTEAD.—The new premises which have been built in connexion with the Lyndhurst-road Congregational Church, Hampstead, are now finished. The work has been carried out by Messrs. Jarvis & Sons, builders, from plans prepared by Messrs. Spalding & Spalding, architects, at a total cost of about 10,000*l*.

CONGREGATIONAL CHURCH, WIMBOURNE.—The opening of the new Congregational church erected in Charminster-road took place a short time ago. The building seats 500 persons, and provision has been made for galleries to be added later, with accommodation for 200 more. The hall, which was formerly used as the church, now becomes the schoolroom, and seats about 350, and is connected by a corridor with the church. Adjoining the hall several new classrooms have been added. The church is illuminated with the electric light, and is fitted with hot water apparatus. The architects were Messrs. Lawson & Reynolds, and the builders Messrs. Shears & Sons, who also carried out the fitting arrangements in regard to lighting and heating. The total cost of the building has been 6,200*l*.

PRESBYTERIAN CHURCH, NEWBURN.—On the 16th inst. the memorial-stones of the new Presbyterian church buildings at Newburn-on-Tyne were laid. The complete scheme includes a church seated for 400, with vestries and classroom and a hall seated for 250. The architects are Messrs. Badenoch & Bruce, Newcastle, and the hall with classrooms is now being built under their superintendence by Messrs. John Jackson & Sons, Newcastle. The hall is of English Gothic design, with open timber roof, and is being built in brick with stone dressings, the facings being red pressed bricks from Messrs. Jones & Maxwell's yard at Pelaw.

CHAPEL EXTENSION, BARRY ISLAND.—Four additional rooms have just been added to the Wesleyan Chapel at Barry Island. The work was carried out by Mr. P. J. Martyn, contractor, Barry, the architect being Mr. G. A. Birkenhead, Cardiff and Barry.

METHODIST CHAPEL, NANTYMOEL, GLAMORGAN.—A Methodist chapel is being erected on a site at the intersection of Oakfield-street by Ogwy-street, Nantymoel. The façade is relieved with blue Forest of Dean dressings; the heating is by hot-water pipes, which were installed by Messrs. Musgrave, of Belfast, and the electric light installation was fitted by the Ogmore Valley Electric Light Company. The total cost amounted to 1,650*l*., the general contractor being Mr. Jenkin Phillips, Nantymoel, and the architect Mr. Jones, Ton, Rhondda. The building will accommodate 450 persons.

BIBLE CHRISTIAN CHAPEL, TOTLAND, HANTS.—A new chapel has been built by the Bible Christians on a site in the main road at Totland. The building, which has accommodation for 400, is in the Gothic style, and is built of Swanage stone, with Bath stone dressings. There is a choir gallery at the back of the rostrum, and the furnishing is in pitch pine. Two vestries, one for the ministers and another for stewards are provided. In addition there is a Sunday school to accommodate 200 scholars. The architect is Mr. Tomkins, and the builder Mr. Geo. Ball, of Cowes, the contract price being 2,190*l*.

MISSION CHAPEL, PLYMOUTH.—A new chapel and refectory, which have been erected in connexion with St. Peter's Mission House, Wyndham-square, Plymouth, were recently opened by the Bishop of Exeter. The work has been carried out with blue Polyphant stone. The builders were Messrs. F. K. Nicholls & Co., Launceston; the architect being Mr. E. Sedding.

WESLEYAN CHAPEL, RYTHER.—On the 7th inst. memorial-stones were laid in connexion with a new Wesleyan chapel at Ryther. The building will be a red brick structure, with buff terra-cotta dressings. There will be classrooms and the usual out-offices. Messrs. Hornsley & Monkman, York, are the architects, and the work is being carried out by Mr. J. W. Cooper, builder, York, and Mr. W. Storr, Cawood, near Selby.

SCHOOL, PORTSWOOD, HANTS.—A new school has been opened at Portswood. The structure has been erected under the superintendence of the Borough Engineer, Mr. J. A. Crowther, from the designs of Mr. J. H. Blizard, architect to the late School Board; the elevations are of local red brick, with Portland stone dressings. A two-story building has been erected for the boys and girls, and a one-story structure for the infants. In the girls' department there are two classrooms, with accommodation for sixty each, and two schoolrooms, with accommodation for 120 each, each schoolroom being divided by a sliding partition. The boys' school has similar accommodation, while in the infants' school there are four classrooms, with accommodation for sixty each, one schoolroom divisible by a sliding partition, accommodation 120, and one classroom, accommodation forty. Each block of buildings has the usual hat and cloakrooms and lavatory accommodation, also rooms for the teachers and stationery and other stores. The infants' school has been provided with a marching hall 60 ft. by 20 ft., the end of which is further utilised as a classroom when not required for assembling the children. The boys' and girls' school is upon the corridor principle, 75 ft. by 10 ft., which is sufficient for the assembling of the children. The lighting is by electricity, and has been carried out under the superintendence of the Electrical Engineer, Mr. H. F. Street. The playgrounds are covered with tar paving. The buildings have been erected by Messrs. Jenkins & Sons, of Southampton and Bournemouth, the heating and lighting by Messrs. Shalders & Davis, the furniture and desks by Messrs. H. Stevens & Co., the Southampton Steam Joinery Co., and Mr. J. W. Finch. The whole expenditure on the buildings, furniture, and fittings will amount to about 17,350*l*.

ROMAN CATHOLIC SCHOOL, BRADFORD.—The foundation-stone of a new Roman Catholic school in connexion with St. Peter's, Leeds-road, Bradford, was laid on the 9th inst. The new building will be a three-storied structure 122 ft. long by 45 ft. wide. The outer walls will be of local pitch-faced wall-stones. Accommodation will be provided for about 600 children. Mr. E. Simpson has prepared the plans, and tenders for the work have been accepted from the following:—Messrs. Samuel Wray & Co., masons; Messrs. John Stow & Co., joiners; Messrs. Jones & Son, plasterers; Mr. S. Rushforth, plumber; Messrs. Hill & Nelson, slaters; Mr. J. Gurnell, painter.

SCHOOL, WOODSEATS.—The Bishop of Sheffield recently opened the new school at Woodseats. The building, which has accommodation for 340 children, comprises only junior and infants' departments, but there is room for the erection of senior departments on the site. Mr. H. L. Paterson was the architect and Messrs. T. Roper & Sons the general contractors. The total cost, including site and fittings, was 9,550*l*.

MISSION HALL, BRISTOL.—The foundation-stones have just been laid of St. Silas' New Mission Hall, Grafton-street, St. Philip's Marsh. The new building is being erected from designs supplied by Messrs. Lingen-Barker & Son, and the builders are Messrs. R. Wilkins & Sons. It will be one story high, faced with Ruabon pressed bricks, with freestone dressings. The hall will be 60 ft. by 53 ft., and 35 ft. high, and provision is made by sliding shutters for dividing it off into classrooms; a kitchen and other offices will also be provided. The site cost about 600*l*., and the building 1,500*l*.

THE HANSON SCHOOL, BRADFORD.—The foundation-stone of the new junior department of the Hanson Secondary Schools, in Byron-street, Bradford, was laid on the 8th inst. The building will be three stories in height. The basement will contain a gymnasium and a physical laboratory for the higher-grade department; on the ground floor accommodation will be provided for infants and junior boys; while on the first floor there will be accommodation for junior girls, and a housewifery centre, containing classroom, kitchen, scullery, sitting-room, bedroom, bath-room, and also a dressing-room. A caretaker's house is also to be provided. The whole of the new buildings, which will be mechanically heated and ventilated, have been designed by Mr. W. Vaughan, Architect to the Education Committee. The accommodation to be provided is for 230 boys, 230 girls, 266 infants, and a special department for forty pupils. The amount of the tenders accepted is 14,676*l*.

SECONDARY SCHOOL, HELSTON, CORNWALL.—The Earl of Mount Edgcumbe recently opened the new secondary school which has been erected at Helston. The school is built of elvan from the quarries of Sir George Smith, with granite facings, from the designs of Mr. W. J. Winn, Borough Surveyor. Mr. R. J. Wearne acted as clerk of the works. There are five large classrooms, and the two on the first floor are constructed so that by the removal of a partition they can be transformed into one room 40 ft. by 20 ft. The cost, including equipment, amounts to about 1,600*l*.

GRAMMAR SCHOOL EXTENSION, KIRKBY LONSDALE.—The opening of new technical and manual training classrooms at the Grammar School, Kirkby Lonsdale, took place on the 13th inst. The alterations have been carried out by Mr. Curwen, architect, Kendal, at a cost of 2,000*l*.

HOME FOR BOYS, TYNEMOUTH.—The foundation-stone of St. Aidan's Home for Boys, Tynemouth, was laid on the 12th inst. The building will have a frontage to Mariner's-lane of 145 ft., and a frontage to the main road of 264 ft. It will be approached from Mariner's-lane, and will contain on the ground floor, entrance hall, play-room, master and matron's sitting-room, dining-room, kitchen and scullery, washhouse and stores, lavatories and bathrooms. On the first floor will be four dormitories and a master and matron's bedroom. An isolation department, containing an isolation-room and an assistant's bedroom, lavatory, and bathroom will also be provided. On the top floors will be workshops. The building will be carried out in pressed brick, with stone dressings. The contract has been let to Mr. J. C. Hope, contractor, Newcastle. Mr. Michael Stevenson has been appointed clerk of works, and the architect is Mr. S. D. Robins, Newcastle. The estimated cost, including boundary walls and furnishing, is 3,200*l*.

OFFICES, GLOUCESTER.—The new offices of the Gloucester Railway Carriage and Wagon Company, in Bristol-road, Gloucester, cover an area of about 850 sq. yds., with a frontage to the Bristol-road of 133 ft. The buildings are warmed and ventilated throughout on the "Plenum" system. The heat is provided by waste steam from the works, conveyed by pipes and "batteries" to their several rooms, corridors, etc. The structure has been erected by Messrs. W. Bowers & Co., of Hereford, from the designs of Mr. M. H. Medland, of Gloucester, Mr. Richard Charnock acting as clerk of the works. The fireproof construction was executed by Messrs. Homan & Rodgers, of Manchester.

SHOP IMPROVEMENTS, WORCESTER.—Improvements have recently been carried out at the premises of Messrs. W. & F. Webb, in High-street, Worcester. The plans for the alterations were by Mr. Ernest Day, and the work was carried out by Messrs. J. S. Wood & Sons, Mr. S. H. W. Jones being responsible for the electric light fittings.

BRAUNSTON, RUTLAND.—A village school is being erected for Mr. Evan Hanbury (the master of the Cottesmore Foxhounds), comprising mixed school and infants' classrooms, three cloakrooms, and the usual offices, built of red brick and covered with Norwegian slates (Grobak green). The whole, exclusive of site, will cost about 1,200*l*. The work is being carried out by Mr. Wm. Emerson, of Oakham, from designs by Messrs. J. B. Corby & Son, architects and surveyors, Stamford and Uppingham.

CHILDREN'S SANATORIUM AND FARM COLONY, STANNINGTON, NORTHUMBERLAND.—The foundation-stone of a children's sanatorium and farm colony, to be erected at Stannington, Northumberland, by the Newcastle and Gateshead Poor Children's Rescue Agency, was laid last Saturday. The sanatorium will be 260 ft. long and is to be divided into three sections—the administrative block in the centre, with the boys' section on the right and the girls' section on the left. The farm colony will be placed on a site 200 yds. from the sanatorium, with accommodation for boys working on the farm. It will be similar in construction to the sanatorium, and will be 140 ft. long. The sanatorium will have accommodation for sixty-four children. The boys' convalescent home will give shelter to sixty additional invalids, and the farmhouse, with the dormitories it is proposed to build on to the existing building, will provide room for twenty lads. Mr. D. M. Spence, of Shotley Bridge, the honorary architect of the Association, prepared the plans for the work, the total cost of which, including the site of 173 acres, will be about 9,843*l*.

BRANCH DISPENSARY, HYSON GREEN, NOTTINGHAM.—The new building constituting the Hyson Green branch of the Nottingham General Dispensary will shortly be opened. Mr. E. R. Sutton is the architect for the work, his designs being accepted in competition. The dispensary is a single-story structure, with a pointed roof over the main entrance, which is in the centre, and is approached by steps. The total length of the dispensary is 48 ft. and the breadth 33 ft. Adjoining is the surgeon's house. Both buildings are faced with red sandstock bricks with Derbyshire stone dressings, and the whole of the woodwork is painted white. Internally the walls are lined with white tiles, except in the operating-room. All internal angles are avoided by the use of curved tiles, the floors are covered with marble mosaic, and the ceilings are of metallic plaster.

The building throughout is heated by a low pressure, hot-water system, through radiators, and lighted by means of electricity. The surgeon's house is a three-story building, having two sitting-rooms and kitchen upon the ground floor, and five bedrooms. Both buildings, including equipment, are expected to cost nearly 3,000*l.*

BRENTFORD MARKET EXTENSION.—Mr. Leopold Rothschild laid the memorial-stone of the extension of the Wholesale Markets at Brentford on the 18th inst. The scheme, prepared by Mr. Nowell Parr, engineer and surveyor, is to cost, by contract, 43,000*l.* The markets will be divided into three covered ways or avenues. The central avenue is to be devoted to waggon stands—twenty-three double and thirty-six single—and the two side avenues will have corresponding spaces for the display of merchandise. Along the main walls, on the north and south sides of the markets, thirty-three shops with 15 ft. frontages are to be constructed.

PUBLIC LIBRARY, CLITHEROE.—The new library and reading-room at Clitheroe, which has been presented to the town by Mr. Andrew Carnegie, is now nearing completion. The plans were prepared by Messrs. Butterworth & Duncan, Rochdale, the contract being let to Messrs. J. Hargreaves & Son, Clitheroe. The building, which is of stone, consists of basement, ground floor, and first floor. The lending library and librarian's room occupy the ground floor, and on the first floor is a reading-room, there also being a room for the use of the Library Committee. The cost of the work has been about 3,000*l.*

WORKHOUSE INFIRMARY, KNARESBOROUGH.—The foundation-stone of the new Knaresborough Workhouse Infirmary was laid a short time ago. The new structure, which is to be set apart for females, is situated at the rear of the workhouse, and is estimated to cost 3,000*l.* On the ground floor will be a ward, 49 ft. by 24 ft., with accommodation for thirty beds. There will also be the administrative block, containing on the ground floor a ward kitchen, linen-room, bathroom, patients' dayroom, 22 ft. by 14 ft., and a two-bed ward. On the first floor of the administrative block there will be a ward kitchen, a dayroom, linen-room, and bathroom. The nurses will take up their quarters on the second floor, where there will be a sitting-room, bathroom, and bedroom accommodation for six nurses. Over the ward on the ground floor will be a second ward, 49 ft. by 24 ft. The floors in the wards and corridors will be fireproof, wood blocks being used chiefly, and tiles in the sanitary annexes. In the basement provision is made for a boiler for heating apparatus, and there will be in addition a larder and coal store. The infirmary will be built of Killinghall stone, with Killinghall ashlar dressings. The contractors are:—Bricklayers and masons, Simpson Bros., Harrogate; carpenters and joiners, Clapham & Taylor, Harrogate; plumber and glazier, George Thompson, Harrogate; slater, Joseph Shepherd, Harrogate; plasterers, Fortune & Calverley, Harrogate; painter, J. W. Simms, Harrogate. The heating apparatus will be installed by Shorland & Sons, and the architect is Mr. J. Houfe, of Harrogate.

CATTLE MART, GATESHEAD.—A new cattle mart was opened at Gateshead on Monday last. The mart is situated in Back Tyne-road East, and has been built from the plans of Messrs. L. H. & A. L. Armour, architects, Gateshead. Accommodation is provided for 200 head of cattle, 600 sheep, and 60 calves and pigs.

BUSINESS PREMISES, BRADFORD.—New premises have been erected for Messrs. Gibson, Boyce, & Co., in Darley-street, Bradford. The architect for the work was Mr. C. H. Hargreaves, and the principal contractors John Moulson & Sons, Ltd., builders, and John Stow, Ltd., shop fitters.

WESLEYAN HALL, HULL.—The Queen's Hall in Alfred Gelder-street, Hull, has just been opened. The principal feature of the scheme is the large hall, 75 ft. 6 in. wide by 103 ft. long, with a gallery round three sides and a choir platform. There are four exits from the main floor, one at each corner of the hall; also four exits similarly placed from the gallery floor. These exits open out on to a crush hall and corridor. On the ground floor a Sunday school is arranged, 52 ft. by 57 ft., with seating accommodation for 550 people. In addition to the above rooms there are the usual classrooms, church parlour, choir, and minister's vestries. A back entrance from George-yard is arranged for carrying on work in connexion with the soup kitchen. Near this entrance a boys' clubroom is provided, which will also act as waiting-room in connexion with the soup kitchen, which it adjoins. For evening use the buildings are lighted throughout by electric light; this is also supplemented by gas in the large hall entrances, staircases, and corridors. The floors of the large hall, entrances, corridors, and staircases are fireproof, those of the entrance vestibules being paved in marble mosaic. The ventilation and warming is carried out by low-pressure hot water heating apparatus, with ventilating radiators. Fresh air is also taken from the upper part of the tower, driven into the building by an electric fan when required. The vitiated air will be exhausted by a sun-burner on the main ceiling. In addition to this, an electric fan is fixed in the main hall. The building is designed in the late Gothic style, and the front is carried out in Ancaster and Portland stone, and the work has been executed by the following:—Brickwork, Mr. F. Beilby; plastering, Mr. R. Metcalfe; masonry, Messrs. Quibell, Son, & Greenwood; joiner's work, Messrs. R. Finch & Co.; plumbing, Mr. W. G. Padgett; slating, Messrs. Wilde & Son; painting, Mr. G. Harbron; electric lighting, Mr. A. Shaw; seating for hall, Mr. Henry Norris; seating for school, Mr. Henry Neal; and glazing, Messrs. Harrison & Andrews, the whole under the supervision of Messrs. Gelder & Kitchen, architects, of Hull. Mr. J. W. Cole has carried out the duties of clerk of works. The scheme has cost about 23,000*l.*, the contract for the building alone being 19,521*l.*

ST. JAMES'S HALL, LYNN.—This building, which was totally destroyed by fire last year, is now being rebuilt. The front of the new structure is of terra-cotta brickwork, with an ornamental dormer window on either side. On entering the porch there is a pay-office on the right, and past this, on either side, ladies' and gentlemen's retiring-rooms, lavatories, etc. The main hall extends 106 ft. and is 42 ft. wide. It is estimated to be capable of seating 800 people, and the balcony has room for 120 reserved seats. The floors are all laid on coat breeze. Ventilation will be secured by three Boyle's ventilators, and the whole building will be heated by hot-water radiators. Mr. W. F. Smith is the contractor for the work, Messrs. Jarvis & Sons being the architects. Mr. William Lock is responsible for the decorating and the lighting, and Messrs. Wickham & Sons fitted the heating apparatus and radiators.

APPOINTMENT.

TWICKENHAM.—At the meeting of the Twickenham District Council, held at the town hall on the 14th inst., the Highways Committee reported the receipt of a letter from Mr. W. Hitchin-Kemp, Assistant Surveyor, that on account of continued ill-health he was obliged to resign. The resignation was accepted, and on the recommendation of the committee, Mr. G. R. King, who is now second assistant in the surveyor's drawing office, was appointed to the vacancy, at a commencing salary of 120*l.* per annum.

FOREIGN.

SOUTH AFRICA.—A new Dominican convent is being built at Rondebosch, near Cape Town. It will be a three-storied building of red brick, with a course of solid stone about 4 ft. high.——Mr. Advocate Gregorowski, who was appointed to arbitrate in the dispute between the master builders of Pretoria and the carpenters, has given his award to the effect that the latter were right in insisting that their right of arbitration had not been invalidated in connexion with the recent ratification of the reduction of wages to 2s. 6d. per hour, but holds that the latter wages under the depressed conditions of the building trade are fair and reasonable, which the men must accept.——The Master Builders' Association of Kimberley, as the result of a meeting called to discuss the Workmen's Compensation Act, has decided to formulate a scheme of insurance against the liability of its members under the Act, and the necessary steps are under consideration.——At Durban a Building Trades' Conciliation Board has been formed to consist of four representatives of each of the representatives of the employers and the employees. It appears that the findings of the Arbitration Court are not legally binding on either party, and there is no compulsion for either side to abide by the decision of the arbitrators.——The plans of the new hospital at Lourenço Marques have been approved by the authorities at Lisbon, and construction will be commenced almost immediately. The estimated cost of the building is 65,000*l.*

MISCELLANEOUS.

PROFESSIONAL AND BUSINESS ANNOUNCEMENTS.—Mr. Jasper J. Kelf, architect, has given up his local offices at Walthamstow and Leytonstone, and his office will henceforth be at Devonshire-chambers, 15 to 18, Bishopgate-street Without, E.C.——Mr. E. Jenkin Williams, architect, of Cardiff, has opened a London office at 30, John-street, Bedford-row, W.C., and has taken into partnership Mr. H. Parry Morgan. The practice will be carried on under the style of "E. Jenkin Williams & H. Parry Morgan."——Mr. A. Vye-Parminter, architect to the English Embassy, Paris, has removed his office from 27, Rue des Acacias, to 62, Rue de Prony, Parc Monceau, Paris.——Messrs. Bergtheil & Young, of 12, Camomile-street, E.C., are appointed sole agents for "Torgament" flooring.——Mr. Leonard B. Wood, who was for many years sole proprietor and, subsequently, senior partner of the firm of Steele & Wood (The Crystal Porcelain Tile Co.), Stoke-on-Trent, is again taking over the business.

SOCIETY OF ENGLISH PAINTERS.—This is a new Society, consisting at present of twenty-two members, among whom are Messrs. Oliver Hall, Lee Hankey, Dudley Hardy, Bertram Priestman, Hughes Stanton, Alfred Withers, and others. The objects of the Society are to hold exhibitions of cabinet pictures in London, the provinces, and abroad. Their first exhibition is to be held during the month of October at Messrs. Dowdeswell's Galleries. Two distinctive features of the Society—embodied in its rules, are:—"The works of all members are subject to the approval of the Council"; and "Every three years all members must stand for re-election." The second exhibition of the Society will be held in Berlin during the month of January.

PATENT OFFICE LIBRARY CATALOGUES.—We received No. 15 of the small books in green cover forming the Patent Office Library Series. This contains the list, under Subjects, of works on "Agriculture, Rural Economy, and Allied Sciences." Among these are Forestry, Irrigation, etc. These useful catalogues are published by the Patent Office, at the price of 6d. each.

SOUTH TRANSEPT WINDOW, WESTMINSTER ABBEY.—The stained glass which until two years ago filled the rose, or marigold, window of the south transept has been offered to the Dean and Chapter of the Cathedral now being erected in Cape Town. The glass, remarkable for the deep tones and brilliancy of its colouring, was the work (1847) of Thomas Ward and J. H. Nixon, and depicted incidents in the life of our Saviour. It was removed to make way for the window (1903) set up in memory of the late Duke of Westminster, which, with the glass in the twelve lights, in two rows, beneath, was executed by Messrs. Burlison & Grylls, under the directions and superintendence of Mr. Bodley, R.A.

POST OFFICE (NEW) BUILDINGS.—On October 16 the King will lay the foundation-stone of the new buildings which will be erected upon the site of Christ's Hospital, between Giltspur-street and King Edward-street, taking in at the west of the area the site of the Compter in Giltspur-street, latterly the Blue Coat boys' open-air gymnasium. During the twelve months ended on March 31 last, the expenditure by the Commissioners of Works and Public Buildings on new Post Office buildings and on the enlargement and maintenance of existing premises amounted to 480,183*l.* in Great Britain and 37,652*l.* in Ireland; the corresponding sums for the previous period being 386,017*l.* and 37,029*l.* respectively. For the purchase of sites and buildings an amount of 123,728*l.* (including 67,273*l.* for London) was expended out of the departmental votes, as compared with 226,327*l.* in 1903-4; during the year 1904-5 the Post Office authorities erected sixty-nine new offices, took over seventy-four offices after their alteration and enlargement, enlarged and improved forty-three Crown post-offices, and began the erection or extension of 142 others.

LIGHTING OF STREETS IN THE CITY.—At the close of the current month the Corporation will put into practice some experiments for testing the value of high-pressure gas as contrasted with the present service of electricity. The eight electric arc lamps in front of Billingsgate Market will be supplanted by 1,000 c.-p. lamps on the resting-places and thirty-three high-pressure incandescent lamps are to be installed in Lower Thames-street in the vicinity of the market. Fleet-street will be provided with thirty-four incandescent gas lamps, in place of the twelve electrical arc lamps, and a similar substitution of forty-five high-pressure gas lamps for twenty-seven arc lamps will be effected in Queen Victoria-street and in Queen-street, Cheapside.

HOMES OF CELEBRITIES: LONDON AND THE SUBURBS.—A memorial tablet has been affixed on the bay-windowed front of No. 16 (west side), Young-street, Kensington, in which, being then No. 13, Thackeray lived (1847-1853), and wrote "Vanity Fair," "Esmond," "Pendennis," and part of "The Newcomes." Similar tablets, of encaustic ware, have just been used to distinguish the homes of Edward Jenner, No. 14, Hertford-street, May Fair; George Grote, No. 12, Savile-row, where the historian resided during the twenty-three years preceding his death in 1871; Robert Stephenson, No. 34, Gloucester-square, Hyde Park; Richard Cobden, No. 23, Suffolk-street, Pall Mall East; Sydney Smith, No. 14, Doughty-street, Mecklenburgh-square, W.C., which was his first house in London during the period 1804-6; Leigh Hunt, No. 10, Upper Cheyne-row, Chelsea, which, being then No. 4, Hunt occupied for some while after 1834—that house was, we may observe, the scene of the strange descriptions of Leigh Hunt's domestic life written by his neighbour Carlyle in his journal, May 24, 1834, and in a letter, June 27, 1839, to his brother Alexander Carlyle; and Mrs. Cross (George Eliot), Holly Lodge, No. 31, Wimbledon Park-road, Wandsworth, occupied by her in 1859-60. We may further observe that No. 56, Great Queen-street, W.C., also marked with a tablet in memory of Boswell, is the east half of the house built by Inigo Jones, or his pupil Webb, which has been inhabited by Sir Godfrey Kneller, Hudson the painter, Hoole the translator of "Ariosto," and Frederick and John Grace. Boswell lived there in 1786-9, when occupied with his "Life of Dr. Johnson," which he brought out in 1791.

A MONSTER HOTEL, NEW YORK.—The *New York American* states that Mr. Adams has instructed Mr. M. C. Merritt, an American architect, to prepare plans and designs for a hotel to be erected upon Mr. Adams's land in Thirty-second and Thirty-third streets. The hotel will accommodate 2,500 visitors, upon forty floors, and will rise to a height of some 500 ft. The cost is computed to be between 400,000*l.* and 600,000*l.*

PARISH CHURCH, LIMINGTON.—A fund is opened for the restoration of the roof and the underpinning of the fabric at the north-east of the chantry chapel of St. Mary's Church, Limington, near Ilchester, county Somerset. Mr. E. Buckle, the diocesan architect, has made a report, and is of opinion that a settlement at that point is the cause, in part, of the fall a few weeks ago of some of the stone slabs which cover the chapel. The chapel, which contains the canopied tomb, with effigy, of Sir Richard Gyverney, founder of the chantry, has a pointed barrel-shaped vault, and the roof is constructed of slabs of Ham stone, without timber. The Marquis of Dorset presented the living of Limington to Cardinal Wolsey in 1500; it was his first preferment, and his cipher appears on a pew in the chancel. Gyverney founded the chantry in 1329; the chancel of the church was restored in 1870, and in 1882 Mr. T. Gordon carried out a restoration of the remainder of the fabric.

FOREIGN CEMENT NOTES.—The British Consul at Lourenço Marques reports that, of a total of 9,127 tons imported last year, Germany supplied 7,645 tons and the United Kingdom only 318 tons. German cement seems to be preferred for two reasons: one brand, which is more expensive than the British article, is stated to be more even and generally superior in quality, and to be very much better packed; other brands are of considerably inferior quality, but they are good enough for ordinary purposes and cheaper than anything from the United Kingdom.——The imports of cement to the Grand Duchy of Finland last year comprised, in metric tons, 18,994 from Germany, 5,465 from Sweden, 1,534 from Denmark, 102 from Russia, and 1 from Belgium; from the United Kingdom, nil. The British Consul attributes this state of things to the fact that "our foreign competitors continue to supply the world with an inferior article at a very much cheaper price."——In Uruguay last year cement to the value of 8,367*l.* was imported from the United Kingdom, a considerable improvement upon the previous five years' average of 6,465*l.* —The demand for British cement in Malaga (writes Mr. Consul Haggard) is very limited. Of imported cement, an inferior "Portland" of French manufacture is chiefly used, prices being 32, 34, and 38 francs per ton in sacks for the various qualities c.i.f. Malaga. Belgian cement also finds a market, the price obtained being 34 francs per ton c.i.f. Malaga. Several of the principal brands of German cement are offered, but with poor results, the prices required—viz., 1*l.* 18*s.* 6*d.* to 2*l.* in barrels and 2*l.* 3*s.* in sacks c.i.f. Malaga—being too high for Spanish buyers. Cement of Spanish manufacture is purchased to some extent by local buyers from Catalonia and the north, and works are now being established in the south. —The most important cement works in the province of Barcelona are situated near the town of Pobla de Lillet, and belong to a company. The plant consists of three rotary kilns and the necessary machinery for rock reduction and clinker refining. The machines and kilns are placed in different levels, and form what is known as a gravity plant. The plant is driven by vertical impulse water-wheels, of which there are nine. The power is furnished by a waterfall conducted to the mill by metal piping, about three miles in length, providing about 2,400 horse-power. The coal used is taken from a lignite mine in the vicinity. The whole property is very extensive, and includes asphalt, cement rock, coal, and forest claims. Up to the present some 100,000*l.* have been spent. The output of cement is about 100 tons per day.

ST. CUTHBERT'S PARISH CHURCH, EDINBURGH. —This church has recently been repainted and decorated. Messrs. J. Ballantine & Son, of Edinburgh, executed the work from designs and under the direction of Mr. Hippolyte J. Blanc.

WAR MEMORIAL, LUDLOW.—The unveiling of the Ludlow war memorial which has been placed in the town hall, took place on the 15th inst. Captain Adrian Jones was the sculptor, and the memorial was cast at the foundry of Messrs. A. B. Burton & Co., Thames Ditton, Surrey.

ARCHÆOLOGICAL DISCOVERY IN BERKSHIRE.— Recent excavations near the village of Watchfield, at the Little Wellington Wood, Berkshire, have revealed an old Roman village. A well 15 ft. in depth containing pieces of pottery and coins has been unearthed. The coins, twenty-four of which have been found, are mostly of the time of the Emperor Allectus.

RESTORATION OF BOLTON PERCY CHURCH.— The restoration of the Church of All Saints at Bolton Percy is now nearly completed. The work, according to the *Yorkshire Post*, has involved re-flooring and certain minor structural alterations, in the process of which several discoveries have been made. A church, presumably Saxon, stood here at the time of Domesday, and there was subsequently an Early English church on the site, of which little is known. The present edifice was built in 1424, and during the re-flooring of the Steeton Chapel several traces were found of the Early English church which preceded it. With the exception of some valuable miserere seats at the entrance to the chancel, and which probably belonged to the early church referred to, the seating arrangements date from the year 1631. They were of the square pew order, and were mostly in excellent preservation, being of good oak. Many of them had panels on which were painted the escutcheons of local families. Traces of the shields still remain. They have been repaired, where necessary, and are now rearranged, so that they all face to the eastward. The old longitudinal pews in the north aisle have been similarly treated, the whole being restored as far as possible to what was believed to be its ancient condition and position. The Renaissance pulpit has been removed from its former position, half-way down the nave, and has been re-erected outside the entrance to the chancel, against the south respond of the chancel arch. The mural monument to Ferdinando Lord Fairfax, which was formerly affixed to the respond of the arch and dominated the "Appleton" pew, has been re-erected between the first and second windows of the south aisle. The pillar was seriously damaged to make room for the Fairfax monument and had really rendered the arch unsafe. That has now been repaired and strengthened. Wherever possible the old material has been utilised, and where new material has been introduced it has been made to harmonise with the other. All the seats, except those in the Steeton and Brockett Chapels, face the east, and those which are retained in the Steeton Chapel and the Nun Appleton seats have been brought in harmony with the rest of the pewing. The ancient piece of screen at the front of the Steeton choir, with its traces of colouring, has been retained, and somewhat extended to fill the gap caused by the removal of the reading desk. The old monumental stones in the floor of the church have been retained, the pillars and dressed stone work of the arches and windows have been carefully cleaned, and the plaster has been repaired throughout. Among the antiquarian discoveries were two altar slabs, found under the floors of the seats of the two side chapels. These have been placed on the floor of that part of the Steeton Chapel not occupied by seats, where they can be seen. Several memorial stones minus the brasses were discovered, but only one with the brass intact. This records the death of Lady Eleanor Selbie, second daughter of Lord Ferdinando Fairfax, and wife of Sir William Selbie, of Twizel, who died in 1670, and was buried in the Brockett Chapel. It has been relaid as nearly *in situ* as was compatible with its being seen. The alterations have been carried out under the supervision of Mr. Bilson, of Hull.

WAR MEMORIAL, GATESHEAD.—The Gateshead war memorial is to be erected in Saltwell Park, and will be unveiled by Lieut.-General Sir John French on November 11 next. The pedestal, which is of granite, with carved decorations of laurel and bay leaves, is surmounted by a life-size bronze figure of "Peace Crowning the Heroes," the total height being about 22 ft. 6 in. Mr. Francis Doyle Jones is the sculptor.

ALMSHOUSES, SPALDING.—The late Mr. Samuel Kingston, F.S.I., auctioneer, who died on the 6th inst., has left, in addition to numerous bequests and legacies, by a codicil to the will, upon trust 2,000*l.* for the purchase of a site and to erect thereon not less than four almshouses in Spalding. The trustees are to employ his friend Mr. J. B. Corby, of Stamford, as architect.

CAPITAL AND LABOUR.

EMPLOYMENT IN THE BUILDING TRADES.—Employment in the building trades continued dull during August, but on the whole it was rather better than a month ago. The improvement affected bricklayers and plumbers generally, masons in England, and slaters in Scotland; in other branches there was little change. Compared with a year ago it was generally rather worse, although in some branches an improvement took place. The falling off compared with a year ago affected all occupations with the exception of plumbers and slaters, and, in some cases, bricklayers, masons and carpenters. The percentage of trade union carpenters and joiners unemployed at the end of August was 6·5, which compares with the same percentage as a month ago and 5·9 per cent. a year ago. The percentage of trade union plumbers unemployed at the end of August was 8·9 compared with 10·1 in July and 9·2 a year ago.—*Labour Gazette.*

BIRKENHEAD BUILDING TRADE DISPUTE.—Mr. A. A. Hudson, the arbitrator appointed to deal with the dispute between the Birkenhead and Wirral Building Trades Employers' Association and the Birkenhead and District Operative Carpenters' and Joiners', Bricklayers', and Stonemasons' societies respectively, has issued his award. The principal differences between the parties arose out of the employers' proposal that in winter the men should breakfast before coming to work. The employers desired that the hours of work in winter should be reduced, and had proposed that the summer period should be extended and the winter period reduced, so that the aggregate hours worked through the year should not be materially reduced, but that the men should breakfast before starting. The arbitrator rejected the proposal that the men should breakfast before starting. He awarded in each case that the winter period, which formerly was from November 1 to the end of February, should be the six weeks before and the six weeks after Christmas, and that the winter working hours should be 42½ a week (instead of 47 as formerly), the starting time being changed from 7 a.m. to 7.45 a.m. in this period.

Legal.

ALLEGED OBSTRUCTION OF ANCIENT LIGHTS.

IN the Vacation Court on Wednesday the case of Fernley *v.* N. Fortescue & Sons, Limited, was in the list for hearing on a motion by the plaintiff for an *interim* injunction to restrain the defendants until the trial or further order from obstructing the plaintiff's ancient lights.

Mr. Bramwell Davis, K.C., in support of the motion, said that the defendants desired an adjournment in order to answer the plaintiff's affidavits, and they undertook in the meantime not to build their walls higher at the side of their buildings. There was a wall with a skylight over it, and defendants would undertake not to break into that wall pending the adjournment.

His lordship granted the adjournment on these terms.

BUILDING IN ALLEGED BREACH OF LONDON BUILDING ACT.

THE case of Allen *v.* Brown Brothers, Limited, was in the list for hearing before Mr. Justice Bray, sitting as Vacation Judge, on Wednesday, on the motion by the plaintiff for an *interim* injunction to restrain the defendants until the trial of the action or further order from building in alleged breach of the provisions of the London Building Act, 1894, and from excavating within 10 ft. of and below the plaintiff's foundations. On the application of Mr. Bramwell Davis, K.C., his lordship allowed the motion to stand over to enable the plaintiff to answer certain affidavits filed by the defendants.

ANCIENT LIGHT DISPUTE.

THE case of Barff *v.* Mann, Crossman, & Paulin, Limited, was in the list for hearing before Mr. Justice Bray, sitting as Vacation Judge, on Wednesday, on a motion by the plaintiff for an *interim* injunction restraining until the trial or further order the defendants building so as to obstruct the plaintiff's ancient lights.

Mr. Bramwell Davis, K.C., said that it had been arranged that the motion should stand over for a fortnight, the defendants undertaking in the meantime not to raise their walls abutting on the ancient windows of the plaintiff so as to interfere with his ancient lights.

His lordship assented.

PATENTS OF THE WEEK.

APPLICATIONS PUBLISHED.*

19,770 of 1904.—J. SANDERSON: *Metal Sash Frames for Windows and the Like.*

THIS relates to metal sash frames for windows and the like, and consists in the method of forming a locking joint where the bars interlock with each other and also at their ends. In carrying out the invention the bar is formed, having a narrow straight slit formed by cutting away a portion of the lower projecting flanged part of its head on each side opposite or above the narrow slitted part, and extending a short distance on each side of the latter. The other bar is formed with a dovetailed slit, and, on inserting a sash bar with the narrow slit within the door having the widened out slit, the former can be pressed to interlock with the latter without the aid of heat.

20,516 of 1904.—J. H. WEBB and R. S. UNDERHILL: *Disinfecting Apparatus for use with a Flushing Cistern.*

A disinfecting apparatus for use with a flushing cistern, which comprises a reservoir for the disinfectant, a chamber which is normally cut off from communication with the reservoir, but is placed in communication therewith for a short time each time the flushing apparatus is operated, and an outlet from the chamber through which the contents thereof flow into the flushing cistern, but through which no considerable proportion of the contents of the chamber can flow during any period while the chamber is in communication with the reservoir.

* All these applications are in the stage in which opposition to the grant of Patents upon them can be made.

21,647 of 1904.—R. ROWBOTHAM and R. ROWBOTHAM, LTD.: *Loose Ashguards or Tidies for Domestic Fireplaces.*

A loose ashguard consisting of a central part and two end parts with the latter hinged to the former, and designed to fold outwards and occupy the usual position, or fold inwards and lie behind the said central part, the said central part formed with an opening at its lower edge, and provided with a cover or lid, which normally closes the said opening, and on being moved is destined to uncover such opening for allowing dust, etc., to be swept behind the ashguard.

22,292 of 1904.—W. MILLER: *Kitchen Grates.*

This relates to a bracket shelf which replaces the usual sliding fret, and is composed of a flat plate, which may be of oblong form, but suitably shaped to clear the fire bars, and at one end it is pivoted to the range front at the side of the fire grate. The hinge or pivot pin may be conveniently formed by lengthening that of the usual fire door, but it may be formed by a separate pin, a thimble-piece being formed on the shelf to provide a suitable bearing on the pivot pin.

22,709 of 1904.—ILLINGWORTH, INGHAM, & Co., LTD., and H. O. INGHAM: *Adjustable School-seats.*

This invention relates to the class of seat that has a pillar-like base, and has for its object means whereby the said seat may be easily adjusted in height. The raising, lowering, and locking device consists of a stem piece carrying a rack, a recessed standard for receiving the stem-piece, arranged with a nesting socket, and a pinion solid with a shank piece, a collar and handle nested in the said socket, all capable of being locked tightly together by a central bolt, winged nut and screw on the said bolt, whether fitted with an outer collar or not.

23,859 of 1904.—A. W. STOREY: *Fusible Link applicable for Certain Forms of Automatic Fire Extinguishing Sprinklers, for Fireproof Doors, and other Similar Purposes.*

A flexible link made in two parts, each carrying a loop or eye, and connected together by a screwed joint, one part consisting of a small cylinder formed of a suitable metal, preferably copper, and then filled with sensitive solder, which is afterwards drilled out so as to leave a thin lining of solder in which a screw thread is then cut. The second part of the link consists of a small plug screw threaded to correspond with the thread in the cylinder.

6,006 of 1905.—J. C. RATTENBURY: *Method of Roof Glazing.*

A method of roof glazing characterised by the roof bars having a double rebate so arranged that in an ordinary downpour the rain finds its way between the sides of the panes into the angle or trough formed by the incline of the inner rest and the side of the roof bar, but in the event of very heavy rains the surplus water forces its way under the panes and over the edge of the inclined rest into the groove between the rest.

6,767 of 1905.—L. H. MAJOR: *Roofing Tiles.*

Roofing tiles having on their outer faces longitudinal rolls or curved corrugations or ribs, so arranged that when the tiles are placed in position in roofing the said corners or ribs extend in a continuous straight line from top to bottom of the roof as distinct from a stepped manner.

9,070 of 1905.—C. WITTKOWSKY: *Process for Uniting Pieces of Wood, Especially Veneers.*

Process for uniting pieces of wood, especially veneers for the production of panels, chair seats, and the like, consisting in the application of a cementing medium of the consistence of dough, and containing very little water, upon one of the surfaces or on both surfaces that are to be united, and then at once, without any drying of the adhesive, uniting the parts in a hot press.

9,238 of 1905.—L. IVES and F. E. GREGORY: *Door Opening and Closing Apparatus.*

A door-operating device comprising a yielding platform, a support having side bars located on opposite sides of the platform, rocking arms journaled upon the support on each side of the platform, means to connect the lower extremities of oppositely arranged rocking arms, means located at the sides of the platform to connect the corresponding rocking arms, mechanism connecting one of the rocking arms with the door to open the door, and springs arranged at the sides of the platform to restore the platform to normal position.

9,631 of 1905.—W. J. PITT: *Means for Preventing the Shaking of Window Sashes.*

This consists of a paralleled piece of metal, wedge-shaped at one or both ends, which, by means of a set screw through a bracket, keeps the window close to the beading and prevents shaking.

18,037 of 1904.—J. PEIGNON: *Machine for the Manufacture of Fencing.*

A machine for the manufacture of fencing, the said machine consisting in the combination of the following elements:—Adjustable reels from which the wires are unwound, guides for the said wires, differential tension regulators corresponding respectively with each of the said guides and receiving the wires guided by the latter, twisters respectively fixed on hollow shafts connected respectively to each of the tension regulators, and serving to twist the wires round the fencing bars individually passed between the wires into the twisters, a device for tightening the wires surrounding the bar during the twisting, pushers for advancing the paling out of the twisters, intermittently operated sprocket chains for moving forward the fencing hooked to the same, and thereby causing the reels to unwind a fresh length of the wires to be worked, and suitable means for simultaneously operating all the twisters, the pushers of the paling, each of the twisters and the sprocket chains advancing the fencing, the rotation of the shafts actuating the twisters taking place at the required moment alternately in opposite directions.

22,043 of 1904.—A. G. GRICE and G. ANDERSON & Co., LTD.: *Automatic Sawing, Moulding, and Dressing of Stone and the like.*

Machine for the sawing, moulding, and dressing of stone and the like, consisting in the combination of a reciprocatory table, on which the stone lies, with a cross guide operated when desired by vertical screws, a slide operated by hand or by power, a saw and a disc carried by and operated from such slide, two templates carried by adjustable brackets on each side of the table, rollers on the cross guide which bear on the templates, and slotted brackets on the cross guide for receiving nuts, and blocks for jamming such nuts.

22,465 of 1904.—J. W. KNIGHTS, W. DRAKE, and W. R. STANTON: *Manufacture of Concrete Slabs, Blocks, and the like.*

Apparatus for moulding hollow concrete blocks or slabs by pressure in a mould, consisting in the combination of a vertical-sided, collapsible, or separate moulding-box, a rammer fitted therein and recessed to give passage to the core, and a vertical-sided core which is collapsible in two directions so as to be capable of being freely removed from within the cavity formed in the block or slab; the said vertical-sided casing is formed of flexible material locally stiffened on its inner side and adapted to be collapsed in two directions under external pressure, a removable cover for said casing adapted to wedge apart the sides of the casing at its upper end, and cam mechanism operated by a rod passing through the cover, said rod serving to hold the core upon the casing and to retain the core as a whole in position within the mould.

9,439 of 1905.—H. R. ROMNEY: *Fireproof Casings and Covers for Electric Conductors.*

Fireproof casings and covers for electric conductors, consisting of asbestos fibre boards, grooved whilst in a dry state by cutting longitudinal grooves upon the surface of such boards, said boards being cut into parallel strips and strengthened and hardened by immersion in a bath consisting of a solution of silicate of soda in water. The strips are then dried and the grooves smoothed by suitable smoothing tools.

14,880 of 1905.—F. SCHLUTER, G. RAUSCHE, and L. GEUSEN: *Means for Protecting the Interior of Buildings and Objects against Fire, and for Extinguishing Fire.*

Method and means for preventing the interior of buildings and objects against fire, and for extinguishing fire, which consists in storing dry pulverulent mineral substances in receptacles above the objects or place to be protected, from which receptacles the said substances are discharged when required in the form of spray on to the objects by means of any suitable known spraying device.

3,929 of 1905.—J. FICHEFET: *Facing of Banks, Slopes, and the like.*

This consists in apparatus for the application to banks, slopes, batters, and the like, of an uniform layer of gravel, or the like, or for levelling hard or soft ground, consisting in the combination with a platform, according to the circumstances, either of a plate for the distribution of the gravel, a knife for cutting projections of the ground, or of a roller for compressing and smoothing the same, said platform being mounted upon a float in such manner as to be capable of rocking, and upon which a facing screen is prepared in advance.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

September 5.—By H. & R. L. COBB (at Rochester).

Shorne, Kent.—"Woodlands" and 22 a. 0 r. 12 p., f.	£2,000
Smith-st., "Prospect-place Cottages" (three), f.	410
"Court Lodge" or "Swillows Farm," 52 a. 1 r. 2 p., f.	2,200
"Shoulder of Mutton" and "Little Dover" Fields, 15 a. 1 r. 19 p., f.	700
"Barrett's Folly" (residence) and Fruit Plantation, 5 a. 0 r. 11 p. f.	700

September 7.—By WALTER LUDLOW & BRISCOE (at Birmingham).

Abberton, Worcester.—Portions of the Abberton Estate, 1,134 a., f. (in numerous lots)	£20,418

By PAXTON & HOLIDAY (at Banbury).

Stuchbury, Northants.—A freehold farm, 266 a. 0 r. 34 p., y.r. 250*l.*	6,000

September 8.—RENDELL & SYMONS (at Exeter).

Widecombe-in-the-Moor, Devon.—The Lizwell, Jordan, and Bittleford Estates, 478 a. 2 r. 30 p., f.	10,000
September 9.—By CUNNAH & ROBERTS (at Chester).	
Seland, Cheshire.—"The Wood Farm," 196 a. 3 r. 1 p., f.	9,050
"Ferry Bank Farm," 174 a. 3 r. 7 p., f.	6,050
"Waterloo Farm," 98 a. 1 r. 4 p., f.	2,900
The Smithy, with farm buildings, etc., 8 a. 2 r. 25 p., f.	705
"Red Houses" (two cottages), f.	225

By RIPPON, BOSWELL, & Co. (at Taunton).

Langford Budville, etc., Somerset.—"Poleshill Farm," 98 a. 0 r. 37 p., f., y.r. 120*l.*	2,600
Bampton, etc., Devon.—Portions of the Nutcombe Manor Estate, 283 a. 2 r. 28 p., f. (in lots)	5,955
September 12.—By C. H. BROWN.	
Pimlico.—100, Denbigh-st., u.t. 25 yrs., g.r. 8*l.*, e.r. 70*l.*	500

By C. W. DAVIES & SON.

Kilburn.—2, Stafford Mews, u.t. 71 yrs., g.r. 5*l.*, w.r. 26*l.*	140
Caledonian-road.—19, Stanmore-st., u.t. 39 yrs., g.r. 12*l.*, y.r. 32*l.*	200
Highbury.—27, Stavordale-rd., u.t. 70 yrs., g.r. 8*l.*, y.r. 40*l.*	340

By A. DOWLE.

Camberley, Surrey.—"Glenwood," and 6 acres, f., p.	2,700
September 13.—By DOUGLAS YOUNG & Co.	
Patcham, Sussex.—The Standean Estate, 673 a., f.	8,500
Lambeth.—Bolney-st., f.g.r. 20*l.*, reversion in 89 yrs.	500
Camberwell.—45 and 47, Coleman-rd., f., w.r. 72*l.* 16s.	820
Clapham.—45 and 46, Cottage-gr., u.t. 40 yrs., g.r. 9*l.*, w.r. 72*l.* 16s.	455
7 and 8, Church-ter., u.t. 21½ yrs., g.r. 10*l.*, y.r. 60*l.*	340
Peckham.—9, Willowbrook-rd., u.t. 17 yrs., g.r. 3*l.*, w.r. 31*l.* 4s.	105

By G. HERBERT & Co.

Portman-square.—11, Baker-st. (s.), a profit rental of 272*l.*, u.t. 15½ yrs.	1,000
Marylebone.—20, Manchester-st., u.t. 7½ yrs., g.r. 30*l.*, y.r. 160*l.*	508
September 14.—By AVANT & CROYDEN.	
South Lambeth.—11, 13, and 15, Dawlish-st., u.t. 32½ yrs., g.r. 18*l.*, w.r. 85*l.* 16s.	400
35, Dawlish-st., u.t. 26 yrs., g.r. 3*l.* 12s. 8d., w.r. 26*l.*	125

By ROGERS BROS.

Dulwich.—24, Elsie-rd., u.t. 66 yrs., g.r. 6*l.* 10s., y.r. 34*l.*	330
62 and 64, Silvester-rd., u.t. 71¼ yrs., g.r. 10*l.*, w.r. 76*l.* 4s.	505
Old Kent-road.—Ormside-st., f.g.r. 20*l.*, reversion in 71 yrs.	500

Contractions used in these lists.—F.g.r. for freehold ground-rent; Lg.r. for leasehold ground-rent; I.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; p. for possession; e.r. for estimated rental; w.r. for weekly rental; q.r. for quarterly rental; y.r. for yearly rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; la. for lane; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; av. for avenue; gdns. for gardens; yd. for yard; gr. for grove; b.h. for beerhouse; p.h. for public-house; o. for offices; s. for shops; ct. for court.

TO CORRESPONDENTS.

NOTE.—The responsibility of signed articles, letters, and papers read at meetings rests, of course, with the authors.

We cannot undertake to return rejected communications; and the Editor cannot be responsible for drawings, photographs, manuscripts, or other documents, or for models or samples, sent to or left at this office, unless he has specially asked for them.

Letters or communications (beyond mere news items) which have been duplicated for other journals are NOT DESIRED.

All communications must be authenticated by the name and address of the sender, whether for publication or not. No notice can be taken of anonymous communications.

We are compelled to decline pointing out books and giving addresses.

Any commission to a contributor to write an article, or to execute or lend a drawing for publication, is given subject to the approval of the article or drawing, when received, by the Editor, who retains the right to reject it if unsatisfactory. The receipt by the author of a proof of an article in type does not necessarily imply its acceptance.

All communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and not to the Editor.

MEETINGS.

WEDNESDAY, SEPTEMBER 27.

Provident Institution of Builders' Foremen and Clerks of Works.—Quarterly Meeting of the Directors. 8 p.m.

SATURDAY, SEPTEMBER 30.

Northern Architectural Association.—Students' Sketching Club Excursion.

PUBLISHER'S NOTICES.

Tel. Tel., 6112, Gerrard. Telegrams, "The Builder, London."

THE INDEX (with TITLE-PAGE) for VOLUME LXXXVIII. (January to June, 1905) was given as a supplement with the number of July 8th.

CLOTH CASES for Binding the Numbers are now ready, price 2s. 6d. each; also

READING CASES (Cloth), with Strings, price 9d. each.

THE EIGHTY-EIGHTH VOLUME of "The Builder" (bound), price Twelve Shillings and Sixpence, now ready.

SUBSCRIBERS' VOLUMES, on being sent to the Office, will be bound at a cost of 3s. 6d. each.

CHARGES FOR ADVERTISEMENTS.

COMPETITIONS, CONTRACTS, ALL NOTICES ISSUED BY CORPORATE BODIES, COUNTY AND OTHER COUNCILS, PROSPECTUSES OF PUBLIC COMPANIES, SALES BY TENDER, LEGAL ANNOUNCEMENTS, etc., etc.

Six lines or under ..... 6s. 0d.
Each additional line ..... 1s. 0d.

SITUATIONS VACANT, PARTNERSHIPS, APPRENTICESHIPS, TRADE AND GENERAL ADVERTISEMENTS.

Six lines (about fifty words) or under ..... 4s. 6d.
Each additional line (about ten words) ..... 0s. 9d.

Terms for series of Trade advertisements, and for front page, and other special positions, on application to the Publisher.

SITUATIONS WANTED (Single-handed—Labour only).

Four lines (about thirty words) or under ..... 2s. 6d.
Each additional line (about ten words) ..... 0s. 6d.

PREPAYMENT IS ABSOLUTELY NECESSARY.

*** Stamps *must not* be sent, but all sums should be remitted by Postal Orders, payable to J. MORGAN, and addressed to the Publisher of "THE BUILDER," Catherine Street, W.C.

Advertisements for the current week's issue are received up to THREE o'clock p.m. on THURSDAY, but "Classification" is impossible in the case of any which may reach the Office after HALF-PAST ONE p.m. on that day. Those intended for the Outside Wrapper should be in by TWELVE NOON on WEDNESDAY.

ALTERATIONS IN STANDING ADVERTISEMENTS or ORDERS TO DISCONTINUE same must reach the Office before TEN o'clock on WEDNESDAY MORNING.

The Publisher cannot be responsible for DRAWINGS, TESTIMONIALS, etc., left at the Office in reply to advertisements, and strongly recommends that of the latter COPIES ONLY should be sent.

PERSONS advertising in "THE BUILDER" may have *Replies addressed to the Office*, Catherine Street, Covent Garden, W.C., *free of charge*. Letters will be forwarded if addressed envelopes are sent, together with sufficient stamps to cover the postage. Unused stamps are returned to advertisers the week after publication.

AN EDITION Printed on THIN PAPER, for FOREIGN and COLONIAL CIRCULATION, is issued every week.

READING CASES { NINEPENCE EACH. By post (carefully packed) 1s.

PRICES CURRENT OF MATERIALS.

*** Our aim in this list is to give, as far as possible, the *average* prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

BRICKS, &c.

	£	s.	d.			
Hard Stocks	1	8	0	per 1000	alongside, in river.	
Rough Stocks and Grizzles	1	4	0	,,	,,	,,
Facing Stocks ...	2	0	0	,,	,,	,,
Shippers	2	0	0	,,	,,	,,
Flettons	1	7	0	,,	at railway depôt.	
Red Wire Cuts ...	1	14	0	,,	,,	,,
Best Fareham Red	3	12	0	,,	,,	,,
Best Red Pressed Ruabon Facing	5	0	0	,,	,,	,,
Best Blue Pressed Staffordshire ...	4	2	6	,,	,,	,,
Do. Bullnose	4	7	6	,,	,,	,,
Best Stourbridge Fire Bricks.....	4	0	0	,,	,,	,,
GLAZED BRICKS.						
Best White and Ivory Glazed Stretchers	12	0	0	,,	,,	,,
Headers	11	0	0	,,	,,	,,
Quoins, Bullnose, and Flats.....	16	0	0	,,	,,	,,
Double Stretchers	19	0	0	,,	,,	,,
Double Headers...	16	0	0	,,	,,	,,
One Side and two Ends	19	0	0	,,	,,	,,
Two Sides and one End	20	0	0	,,	,,	,,
Splays, Chamferred, Squints	20	0	0	,,	,,	,,
Best Dipped Salt Glazed Stretchers, and Header	12	0	0	,,	,,	,,
Quoins, Bullnose, and Flats.....	14	0	0	,,	,,	,,
Double Stretchers	15	0	0	,,	,,	,,
Double Headers...	14	0	0	,,	,,	,,
One Side and two Ends	15	0	0	,,	,,	,,
Two Sides and one End	15	0	0	,,	,,	,,
Splays, Chamferred, Squints	14	0	0	,,	,,	,,
Second Quality White and Dipped Salt Glazed	2	0	0	,,	less than best.	

	£	s.	d.		
Thames and Pit Sand.....		7	0	per yard,	delivered.
Thames Ballast.....		5	9	,,	,,
Best Portland Cement		27	0	per ton,	,,
Best Ground Blue Lias Lime	20	0		,,	,,

NOTE.—The cement or lime is exclusive of the ordinary charge for sacks.

Grey Stone Lime.....12s. 0d. per yard, delivered
Stourbridge Fireclay in sacks 27s. 0d. per ton at rly. dpt.

STONE.

	£	s.	d.		
BATH STONE—delivered on road waggons, Paddington Depôt		1	6½	per ft. cube.	
Do. do. delivered on road waggons, Nine Elms Depôt		1	8½	,,	,,
PORTLAND STONE (20 ft. average)—					
Brown Whitbed, delivered on road waggons, Paddington depôt, Nine Elms depôt, or Pimlico Wharf...		2	1	,,	,,
White Basebed, delivered on road waggons, Paddington depôt, Nine Elms depôt, or Pimlico Wharf...		2	2½	,,	,,

	£	s.	d.		
Ancaster in blocks.....		1	11	per ft. cube,	deld. rly. depôt.
Beer ,, ...		1	6	,,	,,
Greenshill ,, ...		1	10	,,	,,
Darley Dale in blocks...		2	4	,,	,,
Red Corsehill ,,		2	2		,,
CloseburnRedFreestone		2	0	,,	,,
Red Mansfield ,,		2	4	,,	,,

YORK STONE—*Robin Hood Quality.*

	£	s.	d.		
Scappled random blocks	2	10		,,	,,
6 in. sawn two sides landings to sizes (under 40 ft. super.)	2	3		per ft. super.	,,
6 in. rubbed two sides ditto, ditto	2	6		,,	,,
3 in. sawn two sides slabs (random sizes)	0	11½		,,	,,
3 in. to 2½ in. sawn one side slabs (random sizes)	0	7½		,,	,,
1½ in. to 2 in. ditto, ditto	0	6		,,	,,
HARD YORK—					
Scappled random blocks	3	0		per ft. cube,	,,
6 in. sawn two sides, landings to sizes (under 40 ft. super.)	2	8		per ft. super.	,,
6 in. rubbed two sides ditto	3	0		,,	,,
3 in. sawn two sides (slabs random sizes)	1	2		,,	,,
2 in. self-faced random flags	0	5		,,	,,

	£	s.	d.		
Hopton Wood (Hard Bed) in blocks		2	0	per ft. cube.	deld. rly. depôt.
,, ,, ,, 6 in. sawn both sides landings		2	7	per ft. super.	deld. rly. depôt.
,, ,, ,, 3 in. sawn both sides random slabs.....		1	0	,,	,,
,, ,, ,, 2 in. do.		0	8½	,,	,,

SLATES.

in. in.	£	s.	d.		
20 x 10 best blue Bangor	13	2	6	per 1000 of 1200 at r. d.	
20 x 12 ,, ,,	13	17	6	,,	,,
20 x 10 first quality ,,	13	0	0	,,	,,
20 x 12 ,, ,, ,,	13	15	0	,,	,,
16 x 8 ,, ,, ,,	7	5	0	,,	,,
20 x 10 best blue Portmadoc	12	12	6	,,	,,
16 x 8 ,, ,,	6	12	6	,,	,,
20 x 10 best Eureka unfading green	15	17	6	,,	,,
20 x 12 ,, ,,	18	7	6	,,	,,
18 x 10 ,, ,,	13	5	0	,,	,,
16 x 8 ,, ,,	10	5	0	,,	,,
20 x 10 permanent green	11	12	6	,,	,,
18 x 10 ,, ,,	9	12	6	,,	,,
16 x 8 ,, ,,	6	12	6	,,	,,

TILES.

	s.	d.		
Best plain red roofing tiles .	42	0	per 1000 at rly. depôt.	
Hip and Valley tiles ...	3	7	per doz.	,,
Best Broseley tiles.....	50	0	per 1000	,,
Do. Ornamental tiles	52	6	,,	,,
Hip and Valley tiles ...	4	0	per doz.	,,
Best Ruabon red, brown, or brindled do. (Edwards)	57	6	per 1000	,,
Do. Ornamental do	60	0	,,	,,
Hip tiles	4	0	per doz.	,,
Valley tiles	3	0	,,	,,
Best Red or Mottled Staffordshire do. (Peakes).....	51	9	per 1000	,,
Do. Ornamental do.....	54	6	,,	,,
Hip tiles	4	1	per doz.	,,
Valley tiles	3	3	,,	,,
Best "Rosemary" brand plain tiles.....	48	0	per 1000	,,
Best Ornamental tiles	50	0	,,	,,
Hip tiles	4	0	per doz.	,,
Valley tiles	3	3	,,	,,
Best "Hartshill" brand plain tiles, sand faced.	50	0	per 1000	
Do. pressed.....	47	6	,,	,,
Do. Ornamental do	50	0	,,	,,
Hip tiles	4	0	per doz.	,,
Valley tiles	3	6	,,	,,

WOOD.

BUILDING WOOD.	At per standard. £	s.	d.	£	s.	d.
Deals: best 3 in. by 11 in. and 4 in. by 9 in. and 11 in	13	10	0	15	0	0
Deals: best 3 by 9.....	13	0	0	14	0	0
Battens: best 2½ in. by 7 in. and 8 in., and 3 in. by 7 in. and 8 in.	11	0	0	12	0	0
Battens: best 2½ by 6 and 3 by 6 ..	0	10	0	less than 7 in. and 8 in.		
Deals: seconds	1	0	0	less than best.		
Battens: seconds	0	10	0	,,	,,	,,
2 in. by 4 in. and 2 in. by 6 in....	9	0	0	,,	10	0
2 in. by 4½ in. and 2 in. by 5 in....	8	10	0		9	10
Foreign Sawn Boards—						
1 in. and 1¼ in. by 7 in.	0	10	0	more than battens.		
¾ in.	1	0	0	,,		
Fir timber: best middling Danzig or Memel (average specification)	At per load of 50 ft. 4	10	0	5	0	0
Seconds	4	0	0	4	10	0
Small timber (8 in. to 10 in.) ...	3	12	6	3	15	0
Small timber (6 in. to 8 in.)	3	0	0	3	10	0
Swedish balks	2	10	0	3	0	0
Pitch-pine timber (30 ft. average)	3	5	0	3	15	0

WOOD (*continued*).

JOINERS' WOOD.	At per standard. £	s.	d.	£	s.	d.
White Sea: first yellow deals, 3 in. by 11 in	24	0	0	25	0	0
3 in. by 9 in.	22	0	0	23	0	0
Battens, 2½ in. and 3 in. by 7 in.	16	10	0	18	0	0
Second yellow deals, 3 in by 11 in.....	18	10	0	20	0	0
,, ,, 3 in. by 9 in.	17	10	0	19	0	0
Battens, 2½ in. and 3 in. by 7 in.	13	10	0	14	10	0
Third yellow deals, 3 in. by 11 in. and 9 in.	13	10	0	15	0	0
Battens, 2½ in. and 3 in. by 7 in.	11	0	0	12	0	0
Petersburg: first yellow deals, 3 in. by 11 in.	21	0	0	22	10	0
Do. 3 in. by 9 in.....	18	0	0	19	10	0
Battens.....	13	10	0	15	0	0
Second yellow deals, 3 in. by 11 in.	16	0	0	17	0	0
Do. 3 in. by 9 in.....	14	10	0	16	0	0
Battens.....	11	0	0	12	10	0
Third yellow deals, 3 in. by 11 in.	13	0	0	14	0	0
Do. 3 in. by 9 in.....	12	10	0	14	0	0
Battens.....	10	0	0	11	0	0
White Sea and Petersburg:—						
First white deals, 3 in. by 11 in.	14	10	0	15	10	0
,, ,, 3 in. by 9 in.	13	10	0	14	10	0
Battens	11	0	0	12	0	0
Second white deals, 3 in. by 11 in.	13	10	0	14	10	0
,, ,, 3 in. by 9 in.	12	10	0	13	10	0
,, ,, battens	10	0	0	11	0	0
Pitch-pine: deals.....	16	10	0	20	0	0
Under 2 in. thick extra	0	10	0	1	0	0
Yellow Pine—First, regular sizes	44	0	0	upwards.		
Oddments	32	0	0	,,		
Seconds, regular sizes.....	33	0	0	,,		
Yellow Pine oddments	28	0	0	,,		
Kauri Pine—Planks, per ft. cube .	0	3	6	0	5	0
Danzig and Stettin Oak Logs—						
Large, per ft. cube	0	3	0	0	3	6
Small ,, ,, ...	0	2	6	0	2	9
Wainscot Oak Logs, per ft. cube.	0	5	0	0	5	6
Dry Wainscot Oak, per ft. sup. as inch	0	0	8	0	0	9
¼ in. do. do.	0	0	7		—	
Dry Mahogany—Honduras, Tabasco, per ft. super. as inch ...	0	0	9	0	1	0
Selected, Figury, per ft. sup. as inch	0	1	6	0	2	6
Dry Walnut, American, per ft. sup. as inch	0	0	10	0	1	0
Teak, per load	17	0	0	22	0	0
American Whitewood Planks, per ft. cube.....	0	4	0	0	5	0

Prepared Flooring, etc.—	Per square. £	s.	d.	£	s.	d.
1 in. by 7 in. yellow, planed and shot	0	13	6	0	17	6
1 in. by 7 in. yellow, planed and matched	0	14	0	0	18	0
1¼ in. by 7 in. yellow, planed and matched	0	16	0	1	0	0
1 in. by 7 in. white, planed and shot	0	12	0	0	14	6
1 in. by 7 in. white, planed and matched	0	12	6	0	15	0
1¼ in. by 7 in. white, planed and matched	0	15	0	0	16	6
¾ in. by 7 in. yellow, matched and beaded or V-jointed brds.	0	11	0	0	13	6
1 in. by 7 in. do. do.	0	14	0	0	18	0
¾ in. by 7 in. white do. do.	0	10	0	0	11	6
1 in. by 7 in. do. do. do.	0	12	9	0	15	0

6 in. at 6d. to 9d. per square less than 7 in.

JOISTS, GIRDERS, &c.

	In London, or delivered Railway Vans, per ton. £	s.	d.	£	s.	d.
Rolled Steel Joists, ordinary sections	6	0	0	...	6	15
Compound Girders, ordinary sections	7	10	0	...	8	10
Steel Compound Stancheons ...	9	2	6	...	10	12
Angles, Tees and Channels, ordinary sections	7	10	0	...	8	10
Flitch Plates	7	15	0	...	8	5
Cast Iron Columns and Stanchions including ordinary patterns	6	12	6	...	7	15

METALS.

	Per ton, in London. £	s.	d.	£	s.	d.
IRON—						
Common Bars	7	0	0	...	7	10
Staffordshire Crown Bars, good merchant quality.....	7	10	0	...	8	0
Staffordshire "Marked Bars"	9	10	0	...		—
Mild Steel Bars.....	8	5	0	...	8	15
Hoop Iron, basis price	8	15	0	...	9	0
,, ,, Galvanized	16	10	0	...		—

(*And upwards, according to size and gauge.)

Sheet Iron, Black—						
Ordinary sizes to 20 g.	9	0	0	...		—
,, ,, 24 g.	10	0	0	...		—
,, ,, 26 g.	11	15	0	...		—
Sheet Iron, Galvanised, flat, ordinary quality—						
Ordinary sizes—6 ft. by 2 ft. to 3 ft. to 20 g.....	12	10	0	...		—
Ordinary sizes to 22 g. and 24 g.	13	0	0	...		—
,, ,, 26 g.	14	0	0	...		—
Sheet Iron, Galvanised, flat, best quality—						
Ordinary sizes to 20 g.	15	10	0	...		—
,, ,, 22 g. and 24 g.	16	0	0	...		—
,, ,, 26 g.	17	10	0	...		—
Galvanised Corrugated Sheets—						
Ordinary sizes 6 ft. to 8 ft. 20 g.	12	10	0	...		—
,, ,, 22 g. and 24 g.	13	0	0	...		—
,, ,, 26 g.	13	15	0	...		—
Best Soft Steel Sheets, 6 ft. by 2 ft. to 3 ft. by 20 g. and thicker	11	0	0	...		—
Best Soft Steel Sheets, 22 g. & 24 g.	12	0	0	...		—
,, ,, 26 g.....	13	10	0	...		—
Cut nails, 3 in. to 6 in.....	9	0	0	...	9	10

(Under 3 in., usual trade extras.)

LEAD, &c.

	Per ton, in London. £	s.	d.	£	s.	d.
LEAD—Sheet, English, 3lb. and up	16	12	6	...		—
Pipe in coils	17	2	6	...		—
Soil pipe	19	12	6	...		—
Compo pipe.....	19	12	6	...		—

PRICES CURRENT.—*Continued on page 333.*

COMPETITIONS, CONTRACTS, AND PUBLIC APPOINTMENTS.

(For some Contracts, etc., still open, but not included in this List, see previous issues.)

COMPETITIONS.

Nature of Work.	By whom Required.	Premiums.	Designs to be Delivered
Large Shelter or Concert Hall with Café	Bridlington Corporation	35 guineas and 20 guineas	Oct. 20
*BRANCH LIBRARY	Greenwich Borough Council	25l., 15l., and 10l.	Nov. 4

CONTRACTS.

Nature of Work or Materials.	By whom Advertised.	Forms of Tender, etc., supplied by	Tenders to be Delivered
Paperhanging, etc., at Cottage Homes, Birmingham	King's Norton Union	Superintendent, Cottage Homes, Northfield, near Birmingham	Sept. 25
New Building for Children, Hunstanton	The Committee	A. P. MacAlister, 20, St. Andrew's-street, Cambridge	do.
Broken Granite	Tamworth R.D.C.	Council's Surveyor, 22, Church-street, Tamworth	do.
Broken Granite and Siftings	Deal Corporation	Borough Surveyor, Deal	Sept. 26
Making-up and Paving Private Streets	Leyton U.D.C.	Council's Surveyor, Town Hall, Leyton	do.
Portland Cement	Cowes U.D.C.	Council's Engineer, Cowes, I. of W.	do.
Supply of Materials for Twelve Months	Glasgow Corporation	Gas Engineer, 45, John-street, Glasgow	do.
Painting Scavenging Depot, etc.	Halifax Corporation	D. Travis, Town Hall, Halifax	do.
Supply of Cast-Iron Pipes and Special Castings	Tunbridge Wells Corporation	Borough Engineer, Town Hall, Tunbridge Wells	do.
Sinking and Boring a Well	Uxton-on-Severn R.D.C.	Willcox & Raikes, 63, Temple-row, Birmingham	Sept. 27
*ADDITIONAL OFFICES, ETC., TO TOWN HALL	Wood Green U.D.C.	Council's Surveyor, Town Hall, Wood Green	do.
Permanent Way for Tramways	Wemyss Tramways Committee	Stephen Lellon, 36, Victoria-street, S.W.	do.
Electrical Installations at Fire and Police Stations	Manchester Corporation	City Treasurer, Town Hall, Manchester	do.
Painting and Repairing at Workhouse, Infirmary, etc.	Toxteth Park Guardians	Workhouse, Smithdown-road, Toxteth Park	do.
Re-construction of Paving	Luddenden Foot U.D.C.	Council's Surveyor, Luddenden Foot	do.
Making-up Ridler-road	Enfield U.D.C.	Council's Surveyor, Public Offices, Enfield	do.
Erection of School at Mviand	Colchester Education Committee	C. B. Butcher, Architect, 3, Queen-street, Colchester	Sept. 28
Granite or Basalt Macadam	Grays Thurrock U.D.C.	Council's Surveyor, Council Offices, Grays	do.
Pair of Semi-detached Villas, Halifax	.....	G. Buckley & Son, Architects, Tower-chambers, Halifax	do.
Supply of Stones and Gravel	Saltash U.D.C.	Borough Surveyor, Guildhall, Saltash	Sept. 29
Remov. & Building Steel Girder Bdge. over R. Eden	Sevenoaks R.D.C.	Council's Surveyor, Edenbridge	do.
New Classroom at North Mundham Council School	West Sussex Education Committee	G. C. Vernon-Inkpen, Architect, 40, Commercial-rd., Portsmouth	Sept. 30
New School at Beckett-rd., Wheatley, nr. Doncaster	West Riding Education Committee	County Architect, County Hall, Wakefield	do.
Sanatorium at Allt y Mynydd, Llanybyther	West Wales Sanatorium Committee	E. Collier, Architect, 4, Quay-street, Carmarthen	do.
Welsh Granite Macadam	Bollington U.D.C.	Council Offices, Bollington, near Macclesfield	do.
Painting at Union Workhouse	Cardiff Union	Union Offices, Queen's-chambers, Cardiff	do.
Improvement Works, Ulwell-road	Swanage U.D.C.	Councils Surveyor, Town Hall, Swanage	do.
*MAKING-UP ROADS	do.	do.	Oct. 2
Outbuildings, near Isolation Hospital, Beaufort	Ebbw Vale U.D.C.	The Town Surveyor, Ebbw Vale	do.
New School	Bo'ness and Carriden School Board	Smellie, Taylor, & Browne, 167, St. Vincent-street, Glasgow	do.
Supply of Stores for Twelve Months	Lancashire and Yorkshire Railway	Mr. Duffin, Stores Department, Osborne-street, Manchester	do.
Supplying & Laying Cast-Iron Pipes, Filter Beds, etc	Clay Cross U.D.C.	W. H. Radford, Albion-chambers, King-street, Nottingham	do.
Sewage Disposal Works	Birming., Tame & Rea Drain. Bd.	J. D. Watson, Engineer, Tyburn, near Birmingham	do.
*EXTENSION OF ELECTRICITY WORKS	Brighton Town Council	T. Garrett, Architect, 30, Ship-street, Brighton	do.
Extension of East Roof of Glasgow Central Station	Caledonian Railway Co.	Company's Engineer, Buchanan-street Station, Glasgow	do.
Stoneware Pipe Sewer, etc.	Dartford R.D.C.	W. Harston, Engineer, 8, Hythe-street, Dartford	do.
Road-Making and Paving Works	Lewisham Borough Council	Council's Surveyor, Town Hall, Catford, S.E.	do.
Guernsey Granite and Quartzite	Sevenoaks U.D.C.	Council's Surveyor, Argyle-road, Sevenoaks	do.
Cast-Iron Socket Pipes, Special Castings, Valves, etc.	Cowes U.D.C.	Council's Engineer, High-street, Cowes, I.W.	Oct. 3
Cast-Iron Water Mains, Valves, and Specials	Selby U.D.C.	P. Griffith, Engineer, 54, Parliament-street, S.W.	do.
Casting and Laying Mains	do.	do.	do.
Telephones & Elec. Bells at Langho Epileptic Colony	Chorlton & Man. Joint Asy. Com.	Chorlton Union Offices, All Saints', Manchester	do.
*ROAD-MAKING AND PAVING WORKS	Willesden District Council	Council's Engineer, Dyne-road, Kilburn, N.W.	Oct. 4
Enlargement of P.O. at Harrogate	Commissioners H.M. Works, etc.	H. G. Nixon, H.M. Office of Works, Infirmary-street, Leeds	do.
Supply of Stoneware Sewer Pipes	Watford U.D.C.	Council's Engineer, 14, High-street, Watford	do.
Supply of Broken Granite	do.	do.	do.
Sewerage Works, Cassiobridge District	do.	do.	do.
Sewerage of Rickmansworth-road and Hagden-lane	do.	do.	do.
*PORTER'S OFFICE, ASY., SUTTON, SURREY	Metropolitan Asylums Board	Office of the Board, Embankment, E.C.	do.
*BOILER HSE. & CHIMNEY SHAFT, HOMERTON	do.	do.	do.
Wood Paving Works	Dartford U.D.C.	Council's Surveyor, Council Offices, Dartford	do.
*CONSTRUC. LIGHT RAILWAY, WOOD GREEN	Middlesex C.C.	County Engineer, Middlesex Guildhall, Westminster, S.W.	do.
Bridge Works, Road Widenings, etc.	do.	do.	Oct. 5
New School at Pallion	Sunderland Borough Council	Vaux & Mark, Architects, 66, John-street, Sunderland	Oct. 6
Street-making Works	Rowley Regis U.D.C.	Council Offices, Old Hill, Staffs.	do.
*NEW SCHOOLS AT TILEHURST, BERKS.	Berkshire Education Committee	Edwin C. Pinks, Parliament-mansions, Victoria-street, S.W.	do.
Erection of Library at Northfield	King's Norton & Northfield U.D.C.	Council's Surveyor, 23, Valentine-road, King's Heath	Oct. 7
New Fire Station	Eastbourne Corporation	P. A. Robson, Architect, 9, Bridge-street, S.W.	do.
*ALTERATIONS TO EXISTING BATTERY RM.	Pontypridd U.D.C.	R. P. Wilson, Engineer, 66, Victoria-street, S.W.	do.
Supplying and Laying Cast-Iron Pipes	Lanark C.C.	Warren & Stuart, 94, Hope-street, Glasgow	do.
Steam Rolling	Wrotham U.D.C.	Council's Surveyor, Borough Green, Sevenoaks	Oct. 9
Addition to Administrative Block at Hospital	Barnes U.D.C.	Council's Engineer, High-street, Mortlake, S.W.	do.
Sewerage and Sewage Disposal Works	Long Ashton R.D.C.	A. P. I. Cotterell, Engineer, 28, Baldwin-street, Bristol	do.
1,000 yds. of Stoneware Pipe Drains and Other Works	Pontypridd U.D.C.	Council's Engineer, Pontypridd	Oct. 10
Galvanized Iron Fencing and Gates	Southall-Norwood U.D.C.	Council's Engineer, Public Offices, Southall	do.
New Schools, Northwich	County of Chester	A. E. Powles, Architect, 7, Winnington-street, Northwich	do.
Making of Two New Streets, etc., Northwich	do.	do.	do.
*NEW SORTING OFFICE AT DULWICH	Commissioners of H.M. Works, etc.	J. Wager, H.M. Office of Works, Storey's-gate, S.W.	do.
*SUPERSTRUC. NEW PWR. STA., BLACKFRS., S.E.	Commissioners of H.M. Works, etc.	H.M. Office of Works, Storey's-gate, S.W.	Oct. 11
Two Padded Rooms, etc., at Workhouse, Wordsley	Stourbridge Union	Clerk's Office, 12, Hagley-street, Stourbridge	Oct. 12
*LITHO. STORE, ETC., ORD. SURVEY, S'HAMPTON	Commissioners of H.M. Works, etc.	J. Wager, H.M. Office of Works, Storey's-gate, S.W.	Oct. 16
Suction Gas-Producing Plant and Gas Engine	Horsforth U.D.C.	Council's Engineer, 10, Park-row, Leeds	do.
Bore-Hole Pump	do.	do.	do.
*ERECTION OF BATHS	Wandsworth Borough Council	Council House, East Hill, Wandsworth, S.W.	Oct. 27
*NEW POLICE OFFICES, ETC., LEWES	East Sussex C.C.	F. J. Wood, County Surveyor, Lewes	No date.
*ERECTION OF SECONDARY SCHOOL	Bucks Education Committee	Harrington, Ley, & Kelkhum, 65, Bishopsgate Without, E.C.	do.
*LAUNDRY, BERRY WOOD ASY., N'HAMPTON	The Visiting Committee	C. A. Markham, Guildhall-road, Northampton	do.
Detached Scarifier	Darlington R.D.C.	Council's Surveyor, Union Offices, Darlington	do.
New Chapel and Schools, Penarth	The Trustees	H. Budgen, Architect, 95, 84, Mary-street, Cardiff	do.
Materials & Labour for Drain. Land at Sewage Works	Newport (Salop) U.D.C.	Clerk's Office, Newport, Salop	do.
Supply of Steel Tubes	Swansea Town Council	Council's Engineer, Guildhall, Swansea	do.
Police Residence and Lock-up at Lazonby	Cumberland C.C.	G. D. Oliver, County Architect, Carlisle	do.
Retaining Wall, etc., Guildford	Poyle Charity Estate	W. G. Lower, Architect, 12A, High-street, Guildford	do.
*ADDITIONAL WING, BEXLEY HEATH HOME	Foresters' Homes Committee	J. S. Paul & Son, 31, Bedford-row, W.C.	do.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in
*TWO TEMP. ASSISTANTS (ARCHT.'S DEPT.)	Glamorgan Education Committee	2l. 10s. and 1l. 10s. per week	Sept. 22
Inspector of Nuisances	Sheerness U.D.C.	100l.	Sept. 25
Surveyor and Sanitary Inspector	Wantage U.D.C.	130l.	Sept. 30
*ARCHITECTURAL ASSISTANT	Hull Education Committee	100l.	Oct. 4

PRICES CURRENT—*Continued from page 331.*

LEAD, &c. (*continued*)—

	Per ton, in London. £ s. d.		£ s. d.
ZINC—Sheet—			
Vieille Montagne ..... ton	30 5 0	...	—
Silesian.....	30 0 0	...	—
COPPER—			
Strong Sheet.....per lb.	0 0 11	...	—
Thin „ ..... „	0 1 0	...	—
Copper nails ..... „	0 0 11	...	—
BRASS—			
Strong Sheet..... „	0 0 10	...	—
Thin „ ..... „	0 0 11	...	—
TIN—English Ingots ..... „	0 1 5½	...	—
SOLDER—Plumbers' ..... „	0 0 7	...	—
Tinmen's..... „	0 0 8½	...	—
Blowpipe..... „	0 0 9½	...	—

ENGLISH SHEET GLASS IN CRATES.

15 oz. thirds	2½d.	per ft. delivered.
„ fourths.....	2d.	„ „
21 oz. thirds	3½d.	„ „
„ fourths.....	3d.	„ „
26 oz. thirds	4½d.	„ „
„ fourths.....	3½d.	„ „
32 oz. thirds	5½d.	„ „
„ fourths.....	5d.	„ „
Fluted Sheet, 15 oz.....	3½d.	„ „
„ 21 oz.....	4½d.	„ „
½ Hartley's Rolled Plate	2½d.	„ „
⅓ „ „ „	2½d.	„ „
¼ „ „ „	2½d.	„ „

OILS, &c.		£ s. d.
Raw Linseed Oil in pipes	per gallon	0 1 7
„ „ „ in barrels	„	0 1 7½
„ „ „ in drums.....	„	0 1 9½
Boiled „ „ in pipes	„	0 1 9
„ „ „ in barrels	„	0 1 9½
„ „ „ in drums.....	„	0 1 11½
Turpentine, in barrels	„	0 3 10
„ in drums.....	„	0 4 0
Genuine Ground English White Lead	per ton	19 15 0
Red Lead, Dry	„	19 5 0
Best Linseed Oil Putty	per cwt.	0 6 6
Stockholm Tar	per barrel	1 13 0

VARNISHES, &c.	Per gallon. £ s. d.
Fine Pale Oak Varnish	0 8 0
Pale Copal Oak	0 10 6
Superfine Pale Elastic Oak	0 12 6
Fine Extra Hard Church Oak.....	0 10 0
Superfine Hard-drying Oak, for seats of Churches.....	0 14 0
Fine Elastic Carriage.....	0 13 6
Superfine Pale Elastic Carriage	0 16 0
Fine Pale Maple	0 16 0
Finest Pale Durable Copal	0 18 0
Extra Pale French Oil	1 1 0
Rgrabell Flatting Varnish	0 18 0
White Copal Enamel	1 4 0
Extra Pale Paper	0 12 0
Best Japan Gold Size	0 10 6
Best Black Japan.....	0 16 0
Oak and Mahogany Stain	0 9 0
Brunswick Black	0 8 6
Berlin Black	0 16 0
Knotting	0 10 0
French and Brush Polish	0 10 0

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TENDERS.

Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than* 10 a.m. *on Thursdays.* [N.B.—We cannot publish Tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of Tenders accepted unless the amount of the Tender is stated, nor any list in which the lowest Tender is under 100*l.*, unless in some exceptional cases and for special reasons.]

* Denotes *accepted.* † Denotes *provisionally accepted.*

AVELEY.—For the erection of a hall, for Mrs. Martin, in terra-cotta Frazzi fire-resisting floors and partitions. Mr. C. M. Shiner, architect and surveyor, 6, 7, and 8, Crutched-friars, E.C., and Grays, Essex:—
A. E. Brown, Whitechapel, E. £535

BRIERLEY-HILL.—For the erection of a villa, Merry Hill, Quarry Bank, for Mr. A. Shaw, J.P. Mr. A. Ramsell, architect and surveyor, 187, Wolverhampton-street, Dudley:—
A. Webb, Quarry Bank* £680

BROMSGROVE.—For sewage disposal works, Barnsley Hall Lunatic Asylum, for the Visiting Committee. Messrs. Willcox & Raikes, engineers, 68, Temple-row, Birmingham:—

Sutherland & Thorpe ..	£3,149	10	9	Smith & Co.	£2,779	6	6
Hewett & Sons	3,132	16	8	T. Vale & Sons, Ltd.	2,730	0	0
J. H. Macdonald ..	3,010	0	0	J. H. Vickers	2,665	0	0
R. Whitehouse & Sons	2,889	0	0	J. & A. Brazier, Bromsgrove* ..	2,575	16	6
Rowell & Sons	2,886	0	0	Tilt Bros. ..	2,569	0	0
				E. Boore ..	2,529	9	11

CARMARTHEN.—For private street works at Parc Main, for the Corporation. Mr. F. J. Finglah, Borough Engineer:—
E. Davies, Carmarthen* £279 19 0

CHADWELL ST. MARY.—For the erection of a cottage at Brett's Farm, for Mr. Champion B. Russell, J.P. Mr. C. M. Shiner, architect, London and Grays:—
G. Brown* £259 14

CHELMSFORD.—For erecting new classrooms, King Edward VI. Grammar School, for the Governors. Messrs. C. & W. H. Pertwee, architects, Bank-chambers, Chelmsford:—

G. Grimwood & Sons....	£1,495	0	0	H. Everitt & Son	£1,245	0	0
Myall & Upsom	1,359	0	0	H. Potter & Son	1,200	0	0
W. Fincham .	1,333	0	0	J. McKay ..	1,149	0	0
F. Johnson ..	1,280	0	0	P. Parren & Son	1,086	7	6
S. E. Moss & Co.	1,275	10	0	R. Elvery ..	1,050	0	0
J. Smith & Son	1,275	0	0	J. Gowers, Chelmsford‡	995	0	0
F. Weight ..	1,250	0	0				

‡ Withdrawn.

CHURWELL (Yorks).—For erecting three dwelling-houses, Eliand-road, for Mr. E. Stanhope. Messrs. T. A. Buttery & S. B. Birds, architects, Queen-street, Morley:—

Mason: S. Ormerod, Bramley	£433 11
Joiner: T. Grayshon, Morley	140 0
Plumber: F. Hargreaves, Churwell ..	—
Plasterer: J. K. Crossley, Birstall....	29 13
Slater: G. W. Hastings, Leeds	21 10

COLWYN BAY.—For the construction of water supply works, Upper Colwyn Bay, for the Colwyn Bay and Colwyn Urban District Council. Mr. W. Jones, Water Engineer and Surveyor, Council Offices, Colwyn Bay. Quantities by Surveyor:—

G. Lawson..	£6,083	16	6	Hughes & Rowlands	£3,777	16	0
H. Shardlow	4,867	0	0	Underwood & Bro.....	3,718	17	9
F. Mitchell & Sons	4,716	19	10	G. Law, Kidderminster*	3,535	0	0
F. J. Collingwood & Co.	4,423	15	11	Smith & Co.	3,459	13	11
Sheffield & Evans....	4,167	13	10	F. Egan & Sons	3,357	18	6
E. Tabor ..	4,102	16	3				
Parry & Jones	4,057	13	0				

COTTINGHAM.—For erecting a residence, for Mr. R. Kitching. Mr. T. Brownlow Thompson, architect, 15, Parliament-street, Hull. Quantities by W. Hoffman Wood, Park-square, Leeds:—

Marsden & Son	£1,600	0	0	J. Houlton & Son.....	£1,480	0	0
G. W. Richardson	1,592	0	0	G. W. Berridge	1,471	7	0
J. Wilson....	1,585	0	0	H. T. Arnott	1,470	17	0
E. Good & Son	1,557	10	0	F. Bilton ..	1,456	0	0
G. H. Panton	1,575	0	0	H. Hunt ..	1,455	17	3
Hockney & Liggins....	1,549	0	0	G. Houlton	1,450	0	0
Pape & Son'.	1,546	0	0	W. Turner..	1,446	10	0
J. Thompson & Son	1,543	17	9	J. L. Windass	1,416	13	0
M. Harper ..	1,543	14	0	J. H. Wright	1,415	13	9
Amalgamated Builders ..	1,540	0	0	T. Goates ..	1,393	0	0
J. T. Levitt .	1,520	0	0	J. R. Woods	1,372	1	0
Bowman & Son	1,496	0	0	Hill & Stephenson..	1,377	2	5½
Southeons' Executors .	1,480	10	0	H. Kaye ..	1,367	0	0
				J. Carr & others, Hull*	1,055	18	4

DUDLEY.—For the erection of a villa, Stoutbridge-road, Holly Hall, for Mrs. A. E. Farrell. Mr. A. Ramsell, architect and surveyor, 187, Wolverhampton-street, Dudley:—

J. Millward	£510	E. Seckerson, Scottsgreen*	£495
J. Watchorn.....	505		

EXETER.—For erecting workmen's dwellings, for the Corporation. Mr. T. Moulding, City Engineer and Surveyor, Exeter:—
G. Setter, Old Tiverton-road, Exeter .. £7,321

FOREST GATE.—For alterations and additions to St. Bonaventure's Grammar Schools, Khedive-road, for the Rev. A. Darvell. Mr. C. M. Shiner, architect, London and Grays:—

W. Potter ..	£3,025	0	0	Hammond & Son	£2,491	0	0
Godson & Son	2,789	0	0	H. C. Horswill	2,489	0	0
Calnan & Son	2,635	0	0	G. Brown ..	2,383	0	0
Maddison ..	2,591	0	0	Gray & Co.*..	2,333	17	6
Harris	2,568	0	0				

GRANGE-OVER-SANDS.—For street improvement works in Kentsford-road, Kents Bank, for the Urban District Council. Mr. T. Huddleston, Surveyor, Council Offices, Grange-over-Sands:—

J. H. Keith	£2,910	1	4
C. Castle & Co.....	2,808	4	2
Clark & Robinson	2,564	13	0
J. Thoms & Son	2,273	9	0
Hird Bros. & Co.	2,226	11	1
Hewett & Sons	2,200	17	8
Northern Quarries Co.	2,196	18	10
W. Cavadice	2,113	0	0
B. Birch	2,074	15	1
R. Naylor & Son.....	1,967	15	3
J. J. Robson	1,953	7	9
T. Egan & Sons	1,917	8	8
R. Shuttleworth	1,855	16	3
T. & W. Dirkin	1,831	5	1
J. Johnson, Lancaster*	1,678	19	10
Hasson & Waterhouse	1,633	18	5

GRAYS.—For additions to Bridge-road Schools and erection of a manual and cookery block, for the Essex Education Committee. Mr. C. M. Shiner, architect, London and Grays:—

Hawkey & Oldham ..	£7,095	0	0	Haydon & Sons	£4,951	6	0
H. Butcher .	5,679	12	7	J. Brown	4,888	0	0
H. C. Horswill	5,500	0	0	Hammond & Son	4,796	0	0
H. H. Carter	5,436	0	0	W. H. Archer	4,788	0	0
G. Brown ...	5,383	10	0	S. E. Moss ..	4,600	0	0
W. Potter ..	5,220	15	6	H. T. Carter*	4,488	0	0
F. & E. Davy	5,094	0	0				
T. Bruty	5,017	16	0				

GRAYS.—For the erection of a cloak room, also for cement paving, drainage, and heating at Arthur-street Schools, for the Essex Education Committee. Mr. C. M. Shiner, architect, London and Grays:—

	Cloak Room.	Paving.	Drainage.	Heating.
G. Brown ..	£324 0 ..	£169 10 ..	£92 10 ..	—
H. H. Carter*	130 10 ..	160 0 ..	150 0 ..	—
J. J. Lawrence	317 10 ..	— ..	— ..	—
H. E. Wright*	— ..	— ..	— ..	£50

GRAYS.—For heating and gas fittings at Quarry Hill Schools, Grays, for the Essex Education Committee. Mr. C. M. Shiner, architect, London and Grays:—

	Heating.		Fittings.
H. H. Carter	£129	....	—
H. E. Wright*	118	....	£32 0 0
Grays Gas Co.*	—	....	30 15 3

GRAYS.—For the erection of a house in Stanford-road, for Mr. A. H. Morgan. Mr. C. M. Shiner, architect, London and Grays:—

J. Brown	£585 0	H. H. Carter	£506 0
Dobson & Davison	549 10	J. J. Lawrence ..	447 15
		G. Brown*	439 15

GRAYS.—For the erection of three houses in Dell-road, for Messrs. Seabrooke & Astley. Mr. C. M. Shiner, architect, London and Grays:—

J. J. Lawrence	£1,070 0	G. W. Cooke	£950 0
J. Brown.....	1,050 0	Dobson & Davison	805 15
G. Brown	997 0	H. H. Carter*....	792 0
Hammond & Son	960 0	H. Butcher	750 0

GRAYS.—For building a convent school, for the Rev. Mother, La Sainte Union des Sacrés Cœurs. Mr. C. M. Shiner, architect, London and Grays:—

Gray & Co.	£1,850	Dobson & Davisson	1,677
J. Brown	1,810	H. J. Carter*	1,600
G. Brown	1,695		

GRIMSBY.—For plumbing at Laceby Small-pox Hospital, for the Corporation. Mr. H. Gilbert Whyatt, A.M.Inst.C.E., Borough Engineer and Surveyor:—

Hutton Bros. .	£280 0 0	J. Holyoake & Son	£186 10 0
T. Russell....	228 8 0	Manning & Reed	182 14 6
E. Tabor	211 14 10	Cooper & Co.	179 19 0
W. Hardbattle	207 5 0	J. Duke, Ltd.	179 14 10
A. Cook	201 14 8	Goldthorpe & Shuttleworth	174 10 6
H. Siddons ..	197 7 8	D. J. Dolby..	168 13 2
J. Peakman ..	194 0 0	Wood Bros. ..	165 10 0
H. Weldrick..	190 0 0	T. B. Redshaw, Grimsby* ..	161 17 10
G. W. Padgett	189 10 0	Hull & Son ..	153 11 0
Grimsby Coal, Salt & Tanning Co. ..	187 10 0		

HEREFORD.—For erecting a boiler house, chimney shaft, etc., for the Guardians. Mr. W. W. Robinson, architect, 10, King's-street, Hereford:—
M. Warrington, Hyde, near Manchester £514 9 3

HOUNSLOW.—For making-up and sewering portion of Alexandra-road, for the Heston and Isleworth Urban District Council. Mr. P. G. Parkman, Engineer and Surveyor, Town Hall, Hounslow. Quantities by the Surveyor:—
T. Chapman, Cromwell-road, Hounslow* £1,173 8 10

HOVE.—For paving and other works in Pembroke-crescent and Frith-road, for the Corporation. Mr. H. H. Scott, Borough Surveyor, Town Hall, Hove:—

Pembroke-crescent.

J. Parsons & Sons, Church-road, Hove* £183

Frith-road.

J. Parsons & Sons, Church-road, Hove* 199

ISLEWORTH.—For movable timber floor and timber and corrugated iron shed at swimming baths, South-street, for the Heston and Isleworth Urban District Council. Mr. P. G. Parkman, Engineer and Surveyor, Town Hall, Hounslow. Quantities by the Surveyor:—
T. J. Hawkins & Co., Ashford* £140 5

KEIGHLEY.—For erecting a house at Exley Head. Messrs. J. B. Bailey & Son, architects, 3, Scott-street, Keighley:—

Masons: Smith Sharp, Oakworth, Keighley*	
Joiner: W. L. Steel, Keighley*	
Plasterers: H. Emmott & Co., Keighley*	
Plumber: J. Harrison, Keighley*	
Painter: J. Harrison, Keighley*	
Slater: W. Thornton, Bingley*	

KNOTTINGLEY.—For cast-iron settling tank, steel girders, brick piers, etc., for the Urban District Council. Messrs. Garside & Pennington, engineers, Pontefract:—

Engineering Work.

J. Butler & Co., Trustees ..	£837 0 0	J. Mackrell & Co.	£595 0 0
Somervail & Co.	828 0 0	Wheesoe Foundry Co., Ltd.	561 13 6
T. Piggot & Co., Ltd.....	718 10 0	Hunt Bros., Ltd.....	548 7 0
Ashmore & Co., Ltd.	670 0 0	S. Russell & Sons	542 0 0
R. & J. Dempster	637 0 0	Newton, Chambers, & Co., Ltd.	527 8 5
Clapham Bros., Ltd.	618 5 0	Sheepbridge Coal & Iron Co.	500 13 9
T. Tattersall & Sons.....	616 0 0	Saxon Engineering Co., Featon*	491 10 0
E. & W. H. Haley	615 0 0		

Bricklaying Work.

J. B. Stanhope.	£225 0 0	Higgins & Pashley	£169 17 8
R. Walker & Sons.....	210 0 0	G. Clements, Featherstone*	166 5 5
Walker Bros...	198 18 0		
A. Askham....	189 9 0		

LINGFIELD.—For alterations and additions to Lingfield Council School, for the Surrey Education Committee. Messrs. Jarvis & Richards, architects:—

W. Harman..	£5,615	3	0
F. F. Foster	4,998	0	0
W. H. Hyde	4,749	0	0
G. Wade	4,598	0	0
W. T. Toogood & Co.	4,531	0	0
Cropley & Sons.....	4,520	7	6
Baldwin & Stanford ..	4,518	1	5
J. Quittenton	4,499	14	6
J. Barker & Co.	4,435	0	0
I. Waters & Sons	£4,278	11	0
W. Roberts..	4,249	12	4
R. Elvy	4,202	0	0
J. J. Pink ..	4,191	5	0
Drowley & Co.	4,054	12	1
M. Wells & Co.	4,010	0	0
East & Hyde	3,960	0	0
S. E. Moss & Co.	3,862	10	0

LLANAELHAIARN.—For the erection of a new schoolroom, for the Babell C.M. Committee, Llanaelhaiarn. Mr. W. W. Jones, architect, Salem-place, Pwllheli :—

W. & R. Jones ..	£390 0	J. T. Jones.....	£360 0
E. Thomas.....	378 10	Jacob & G. Williams, Llanaelhaiarn*	354 6
J. Price	370 0		
W. Owen	370 0		

LONDON.—For alterations to engineering arrangements, etc., in laundry at the South-Eastern Hospital, New Cross, S.E., for the Metropolitan Asylums Board. Mr. W. T. Hatch, Engineer-in-Chief :—

Moorwood, Sons, & Co., Ltd.....	£2,775
Death & Ellwood	2,500
Lea, Son, & Co.	2,330
T. Potter & Sons, Ltd.	2,175
South-Eastern Engineering Works	2,039
J. & F. May.....	1,910
J. Simpson & Co., Ltd.	1,828
Wenham & Waters, Ltd., Paragon Works, Croydon*	1,810

PURFLEET.—For the erection of a house, for the Purfleet Chalk Quarries Company. Mr. C. M. Shiner, architect, London and Grays :—

Hammond & Son..	£750	G. Brown	£647
J. Brown.....	660	Dobson & Davisson*	620
J. J. Lawrence	663		

REIGATE.—For the erection of house, etc., Pilgrim's-way, for Mr. E. Poland. Mr. C. E. Salmon, architect, Bell-street, Reigate :—

G. Martin	£2,680	W. Bagaley & Sons	£2,350
C. Nightingale & Sons	2,419	J. King & Son* ..	2,185

RUSTINGTON (Sussex).—For new sun room, bay windows, verandahs, lavatories, etc., to Millfield Homes. Messrs. Rowland, Plumbe, & Harvey, architects, 13, Fitzroy-square, W. Quantities by Messrs. Fowler & Hugman :—

	Alterations.		Painting.
Cropley & Sons	£3,199 0 0	....	£752 0
Kirk & Randall	2,892 0 0	....	739 0
Cropley Bros., Ltd...	2,873 0 0	....	649 0
Lole & Co.	2,835 10 8	....	542 10
J. Parsons & Sons ..	2,809 0 0	....	838 0
J. Longley & Co. ..	2,739 0 0	....	849 0
H. Kent	2,701 0 0	....	616 0
A. F. Vigor & Co. ..	2,622 0 0	....	679 0
W. A. Field & Co. ..	2,562 0 0	....	812 0
Higgs & Hill, Ltd. ..	2,544 0 0	....	594 0
G. Godson & Sons ..	2,522 0 0	....	680 0
Peerless, Dennis, & Co.	2,485 0 0	....	636 0
W. Johnson & Co., Ltd.	2,485 0 0	....	635 0
J. Martin	2,450 1 11	....	715 0
F. Sandell & Sons ..	2,390 0 0	....	524 0
R. Cook & Sons	2,318 0 0	....	662 0
J. Linfield & Sons, New-road, Littlehampton*	2,279 0 0	....	541 0

SHEFFIELD.—For the erection of seventy dwellings, Edmund-road and Clough-road. Mr. C. F. Wike, M.Inst.C.E., City Engineer, Sheffield :—

Excavators, Bricklayers, and Masons: Wellerman Bros., Hyde*	£7,836 0 0
Carpenters and Joiners: T. Roper & Son, Sheffield*	2,855 5 8
Plumbers and Glaziers: Hull & Son, Nottingham*	698 0 0
Plasterers: T. Roper & Son, Sheffield*....	770 0 0
Slaters: Dawber, Townsley, & Co., Ltd., Hull*	641 16 0
Painter: A. Machin, Sheffield*	202 19 9

SHEFFIELD.—For alterations and additions to Wesley College Buildings to adapt them for use to King Edward VII. School, for the Education Committee. Messrs. Gibbs & Flockton, architects, 15, St. James's-row, Sheffield :—

Armitage & Hodgson	£23,660 0 0
D. Gill & Son	23,381 0 0
H. Brumby & Son	21,700 0 0
W. & A. Forsdive	21,530 0 0
J. Eshelby & Son	21,350 0 0
G. Carr	21,200 0 0
J. T. Wright	21,200 0 0
D. O'Neill & Son	21,150 0 0
T. Wilkinson & Sons	20,908 0 0
T. Roper & Sons, Ltd.....	20,877 0 0
J. Fidler, Ltd.	20,827 0 0
J. Vasey & Son	20,710 0 0
G. Longden & Son, Ltd.	20,531 14 11
J. Mastin & Son	20,500 0 0
H. Boot & Son	20,000 0 0
T. Lowe & Sons	19,985 0 0
Ash, Son, & Biggin, Ltd.....	19 860 0 0
Dawson, Jones, & Co., Sheffield*	19,298 15 0

SOUTHAMPTON.—For erecting artisans' cottages on the Sunnel-street area, for the Corporation. Mr. C. J. Hair, architect, 23, Portland-terrace, Southampton. Quantities by Mr. J. F. Crook, Cambridge-road, Southampton :—

Brown & Sons..	£3,399 0	G. R. Long....	£3,174 15
H. J. Hood....	3,298 0	J. Nichol, Bitterne Park, Southampton‡	3,099 0
Jenkins & Sons, Ltd.	3,264 0		

‡ Recommended for acceptance by Committee.
[Architect's protecting tender, £3,276 6 5]

STIFFORD.—For the erection of a cottage at Stifford Lodge, Essex, for Mr. H. E. Brooks. Mr. C. M. Shiner, architect, London and Grays :—

G. W. Cooke	£460	J. J. Lawrence	£411
J. Brown	449	H. J. Carter.....	318
G. Brown	432	Dobson & Davisson*	263

TILBURY DOCK.—For the erection of eight cottages in Malta-road. Mr. C. M. Shiner, architect, London and Grays :—

G. W. Cooke* £1,600

TILBURY DOCK.—For the erection of five shops in Dock-road. Mr. C. M. Shiner, architect, London and Grays :—

G. W. Cooke* £1,920

TOOTING BEC.—For dismantling and re-erecting boiler feed pumps, etc., and building work in connexion at Tooting Bec Asylum, for the Metropolitan Asylums Board. Mr. W. T. Hatch, Engineer-in-Chief :—

Welch, Benham, & Co.	£264 13	H. & C. Davis & Co., Ltd.....	£215 0
T. Potter & Sons, Ltd.....	234 0	Western Engineering Co.....	207 10
G. Hopkins & Sons	218 0	G. Elliott & Co., Long-lane, Bermondsey*‡.	200 10
J. & F. May	215 0		

[‡ £5 less if armature is not defective.]

WOKING.—For the erection of a new school at Maybury, Woking, for the Surrey Education Committee. Messrs. Jarvis & Richards, architects :

F. Aylott	£6,966 16 9	McC. E. Fitt	£6,249 0 0
J. Barker & Co.	6,818 0 0	Higgs & Outhwaite	6,195 0 0
Toogood & Co.	6,745 3 7	E. C. Hughes	6,158 0 0
T. Stimson ..	6,566 4 4	Drowley & Co.	6,077 6 4
G. Kemp	6,459 0 0	R. Elvy	5,996 0 0
Martin, Wells, & Co.....	6,450 0 0	T. J. Hawkins	5,885 0 0
J. Hart.....	6,350 2 8	S. E. Moss & Co.	5,702 0 0
East & Hyde	6,329 0 0		

YNYSYBWL.—For alterations and additions to Zion English Baptist Chapel, for the Trustees. Messrs. Morgan & Elford, architects, 1, Jeffrey-street, Mountain Ash :—

Williams Bros., Ynysybwl, Pontypridd* .. £1,600

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